Protecting Workers and Homeowners from Wood Floor-Finishing Hazards in Massachusetts

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1. EXECUTIVE SUMMARY

a. Background

Wood floor sanding and finishing can expose workers, building occupants, homeowners, and residents of surrounding neighborhood to a variety of health and safety hazards. Three Massachusetts workers have died over the past year in fires from wood floor finishing. Since 1995 Boston has experienced more than 25 fires directly attributed to hardwood floor installation and refinishing, resulting in a property loss value of over 1.5 million dollars.[1] In Needham alone, two homes burned due to wood floor finishing in the past year.

Nationally from 1992-2002, 52 fatal injuries were sustained by workers in the floor laying/other floor work business (Standard Industrial Code 1752, not necessarily wood floors). Of these injuries, 21% (11/52) resulted from fires and explosions. Five of the workers who died due to fire or explosion were employed specifically in wood floor sanding.[2] These fires as well as air pollution from certain floor finishing products can present public safety and health threats to the residents of the affected buildings and neighborhoods. The New York City Fire Department has instituted citywide regulations restricting the use of flammable products.

b. Purpose of This Report

Over the past year, a Floor Finishing Safety Task Force comprising community, health, safety, academic, and economic development organizations has investigated solutions to address the critical problems of fires and health hazards associated with floor refinishing**.** As part of this investigation, Task Force members and the Massachusetts Toxics Use Reduction Institute conducted interviews with business owners and product distributors, field investigations, and laboratory testing of a range of products and practices. They also convened representatives of the floor finishing industry, labor unions, safety and fire protection agencies, scientists, health care providers, environmental and community groups. Based on this input, the Task Force developed a series of policy recommendations for protecting the health and safety of hardwood floor finishers, their customers, the environment and the general public.

The resulting report and recommendations are intended to

1. Provide information for legislators who seek to promote safer floor finishing practices
2. Help employers, unions, professional organizations, consumers and community organizations understand hazards and safety measures related to floor finishing

c. Key Findings

Through its investigation the Task Force produced the following key findings:

1. Non-flammable products are commercially available. Products implicated in floor finishing fires are frequently flammable liquids, especially lacquer sealers. ("Flammable" means that they vapor above the liquid service ignites easily when the liquid reaches temperatures below 100° F) Yet simply employing safety measures, such as extinguishing pilot lights or not smoking, will not prevent all sparks that can

ignite the vapors of these liquids. Tests conducted by Green Seal and the Massachusetts Toxics Use Reduction Institute have found that non-flammable water-based products meet or exceed nearly all quality measures of flammable products tested. Although water-based products typically cost more than oil-based products ($30-90 per gallon versus $10 - $30 per gallon), a number of Boston-area floor finishing businesses use water-based finishes for some or all jobs. These companies choose water-based finishes because they are more durable, reduce solvent exposure, dry in less time, allow occupants to return to the premises faster, and do not cause fires. Many non-flammable oil-based products are also available.

2. Small business owners face a number of barriers to safer and healthier products and practices. Increasing numbers of Boston hardwood floor finishing businesses are owned and operated by Vietnamese immigrants. With little access to training in finishing techniques or health and safety, and virtually no Vietnamese-language information on the industry and its hazards, many of these companies rely on word-of-mouth and product distributors for advice on products and practices. Yet, some distributors do not stock or promote safer products. Small companies may also lack understanding of the cost-benefit tradeoffs of using non-flammable products.

3. Massachusetts boasts a range of resources for addressing the urgent issues associated with wood floor finishing. Vietnamese-American community groups have built strong networks of trust and communication with local businesses. Their input will be key to developing policies effective for this industry. Organizations including the Massachusetts Toxics Use Reduction Institute and New Ecology, Inc. possess expertise key to the identification, testing, and promotion of safer products. The Division of Occupational Safety (DOS) oversees licensing of asbestos and lead contractors, and the DOS's OSHA Consultation Program provides free health and safety assistance to small businesses. The Dorchester Occupational Health Initiative, a partnership of non-profit organizations, community health centers, and university researchers, is charged with developing health and safety education with Vietnamese-American hardwood floor finishers in Boston.

d. Priority Recommendations

We call upon the state of Massachusetts to:

1. Establish a licensing program for floor refinishing businesses, as proposed in House Bill 3375. To ensure that the program is effective and accessible to people from diverse cultural and economic backgrounds, take immediate steps to form an oversight committee which comprises all affected stakeholders, including workers, small businesses, community organizations, labor unions, and health and safety experts.

2. Require both use and sales of non-flammable floor finishing products with flash points at or above 100° F in place of flammable products with flash points below 100° F.

3. Promote the use of safer and healthier floor finishing products through mechanisms such as tax credits, grants, low-interest loans, or other means of providing economic support for small businesses to substitute safer and healthier products and equipment for those associated with fire hazards and other public health hazards. Promote state procurement through the Massachusetts Environmental Purchasing Program.

4. Partner with organizations such as the Dorchester Occupational Health Initiative to develop, distribute, and promote culturally and linguistically training materials on safer and healthier products and practices. Extend these efforts throughout the Commonwealth.

2. BACKGROUND

a. Hazards of Hardwood Floor Finishing

Products used in floor finishing can affect the health of floor finishers, building occupants, homeowners, and neighborhood residents. These products include flammable sealers and finishes, respirable wood dust, and organic solvents. Some specific wood floor refinishing products contain substances that can harm the central nervous system or reproductive system, or can cause cancer. Some products contain ingredients that can trigger allergies or asthma.[4] [5] Workers can be injured by flying objects dislodged during sanding and can experience sprain and strain injuries from carrying and manipulating heavy, awkward equipment.

One of the most serious hazards is fire. Nationally from 1992-2002, there were 52 fatal injuries sustained by workers in the floor laying/other floor work business (SIC code 1752, not necessarily wood floors). Of these injuries, 21% (11/52) resulted from fires and explosions.[1] Five of the workers who died due to fire or explosion were employed specifically in wood floor sanding.[2]

In 2002, the New York City Fire Department responded to increasing number of fires and serious injuries associated with floor finishing operations by regulating flammable and combustible products used for sealing, varnishing, lacquering, otherwise finishing floors.[6]

In September 2004, Toan Bui, and Ha Vu, both 35, were burned to death at a Somerville home where they were refinishing wood floors.[7] Two of their co-workers were badly burned. In July 2005, Tinh Huynh, 43, died in a similar fire in Hull.[8] The tragic details of these deaths have become well known in Massachusetts. Media accounts of other such accidents in different regions are attached to this report.

Fortunately, not all such fires have resulted in deaths. In 2004 the Boston Fire Department stated that since 1995 Boston had experienced more than 25 fires directly attributed to hardwood floor installation and refinishing, resulting in a property loss value of over 1.5 million dollars.[1] Fires caused by floor finishing have recently ruined at least two homes in Needham.

b. Flammable Products

The products implicated in these fires are frequently flammable liquids, especially lacquer sealers. Flammable liquids have flash points under 100° F. This means that any spark or ignition source can easily ignite the mixture of product vapor and air near the surface of the liquid when it reaches these temperatures. In fact, some floor finishing products have flash points well below normal room temperatures, around 50° F or 25° F (see Material Safety Data Sheets for commercially available products). The product used in the job leading to the fatal Somerville fire had a flash point of 9° F.

Some of the most flammable products are certain lacquer sealers, which have been implicated in several recent fires. These types of sealers are inexpensive and dry very quickly. Therefore, they are used by some contractors as a quick first coat under coats of finish.

Safety measures recommended for using flammable liquids include preventing known sources of sparks. This involves extinguishing all pilot lights, disconnecting electric appliances such as stoves and refrigerators, covering electric outlets, using only non-sparking tools, and, of course not smoking. All containers should be closed when they are not in use to prevent sparks from coming into contact with the vapor-air mixture above the surface of the liquid.[1 6] In addition, maintaining ventilation as stipulated in the manufacturer's instructions will help dilute the product vapors in the rest of the room, potentially to a concentration that is too low to ignite.

The challenge to these safety measures results from the fact that is nearly impossible to prevent all sparks. For example, use of ventilation devices requires electricity, which can produce sparks. Turning on a light switch can produce sparks. Simply pouring liquid from one container to another can create enough friction to cause sparks if containers are not grounded. Static electricity can also result from other types of friction, especially in dry weather. Striking a metal object, such as a nail or staple in the floor, can produce sparks.

A recent California fire was sparked when a floor finisher scrubbing the floor with steel wool hit a brass electrical plate, igniting the steel wool and in turn the airborne vapors.[9] The Hull fire that killed Tinh was ignited by the pilot light of a water heater,[8] and the fatal Somerville fire also appears to have been ignited by a pilot light.

Vapors can travel from where they are being applied. If they reach a sufficient concentration, they can be ignited there. A fire described in an attached article badly burned a man working in his basement when floor finishing solvent vapors traveled from another part of his house.[10]

c. New Product Regulations in Massachusetts

In 1998, the Environmental Protection Agency reduced permissible levels of volatile organic compounds (VOCs) in architectural coatings, including floor sealers and finishes.[11] Most states belonging to the Ozone Transport Commission, which includes

Massachusetts, have further reduced permissible levels of VOCs in floor finishing products sold or used in quantities exceeding one liter. Within the next year, Massachusetts is expected to reduce permissible VOC concentrations to 450 grams VOC/liter of product for floor finishes, and to 550 grams/liter for sealers.[12]
These new regulations are designed primarily to prevent unhealthy levels of air pollution. They are important to the protection of the public health. However, a variety of floor finishing products that meet or exceed these new standards are still highly flammable. Therefore, the new regulations in and of themselves will not prevent floor finishing fires.

d. Non-Flammable Alternatives

Many non-flammable floor finishing products are commercially available. "Non-flammable" in this case means that they have flash points at or above 100° F. Therefore, they have to reach a temperature of 100° F or above before the vapor near the surface of the liquid is easily ignited by a spark. Some non-flammable oil-based products are still combustible, meaning that they have flash points below 200° F, so may present a fire hazard in some circumstances. Others, especially water-based products, present practically no fire hazard. (Water-based products do contain some chemical solvents and, like oil-based products, may include various toxic ingredients.)

New Ecology, Inc.(NEI), a Cambridge-based non-profit devoted to sustainable urban development in New England, collaborated with the Dorchester Occupational Health Initiative to identify non-flammable sealers and finishers designed for finishing hardwood floors. These groups selected a sample of several non-flammable, water-based finishes produced by various manufacturers. Criteria used for selecting these products included availability in the Boston area; low levels of reproductive and neurological toxicity of the listed ingredients; and low risk of triggering allergies or asthma.

The Surface Cleaning Laboratory of the Massachusetts Toxics Use Reduction Institute conducted a series of quality tests on these products and on oil-based products. Tests were based on specifications and testing methods by the North American Laminate Flooring Association.[13] Products were tested for gloss (the amount of "shine" created); indentation damage from small area loads as a measure of resistance to sharp-edged small objects; resistance to impacts from dropped objects; surface damage from repeated rolling forces, to simulate heavy castored loads such as beds, desks and appliances; abrasion resistance; and the coefficient of friction as a measure of slipperiness.

The non-flammable water-based products met or exceeded nearly all quality measures of the oil-based products. The main oil-based finish tested performed better than most of the water-based compounds only in the area load test. In particular, the water-based finishes dried significantly faster.

These results are consistent with those presented in a February 2005 Green Seal *Choose Green* report on wood finishing products. This report recommends several high-quality, scuff resistant water-based products.[2] NEI has found that most water-based products dry

in three to four hours, as opposed to oil-based products which can take eight to 24 hours to dry between coats.

NEI has investigated floor finishing services offered by several established Boston-area businesses and identified several that use water-based finishes for some or all jobs. These companies reported that they choose to use water-based finishes because they are more durable and less toxic, and dry in less time. These factors can eliminate the need to vacate entire buildings for days, which is often necessary when oil-based compounds are applied.

Professional finishers have explained to NEI that water-based application requires more precise techniques to achieve appearances as attractive as those produced through less skilled application of oil-based finishes. Additional buffing is also required. However, the water-based products' faster drying time allows workers to complete an entire job in less time and residents to return to their homes sooner after floors are finished.

The use of oil-based sealers creates an appearance that is preferred in some markets. However, specialty techniques allow the creation of similar appearance with water-based products. If oil-based finishes are desired, such products are available with flashpoints above 100 °F ("non-flammable").

Daphne J. Verardi, President of Verardi & Company, Inc., has written of

> ...the many hazards associated with hardwood floor finishing and steps that must be taken to protect our workers, our customers and the environment. Among the many potential dangers are fire hazards, health effects such as cancer, sarcoidosis, asthma, allergies, auto-immune diseases, and environmental issues. Wood and finish dust, which is a known carcinogen, is also one of the great hazards to finishers and homeowners.... [My business is] an example of a successful company [which] is both dustless and 100% water-borne. To conquer the myth that water lacks beauty, longevity, and durability, I will present examples of award winning floors that have the look of oil - but are finished with water.... Hopefully we will begin an industry-wide paradigm shift that will stop the price wars so prevalent in this industry.

e. Dust Collection Systems

The large quantities of fine wood dust produced during floor sanding can be hazardous to workers and building occupants. This is of particular concern because wood dust is known to cause cancer in humans. Sanding of floors coated with lead-based paint can also disseminate respirable particles containing lead. (Floors with lead paint must be treated as a lead abatement job, by a licensed lead abatement contractor in compliance with 454 CMR 22.) Dust can also affect the quality of the final finish, and present hygiene and aesthetic issues for residents and neighbors. For the purposes of this report, it is important to note that airborne wood dust at sufficient concentrations can ignite and propagate fires.

NEI has found that several manufacturers produce dust collection systems for floor sanding equipment. These include trailer-mounted and portable models such as vacuum attachments and adapters. Recent tests show that such systems can significantly reduce

airborne dust concentrations. These systems are, however, large and heavy. Small portable devices can cost between $1000 and $9000; trailer mounted units can cost $20,000 to 50,000.

f. Barriers to Change

The hardwood floor finishing industry is composed of a wide range of large and small companies. Small companies face challenges in obtaining the capital necessary for investment in control devices such as dust collection systems. They may also lack access to training in the techniques for successful application of water-based products or to basic health and safety information. Small companies may engage in intense competition and seek the least costly approach to completing jobs. In the short run, this can include use of the less expensive oil-based compounds and replacing initial coats of finish with flammable lacquer sealer.

Increasing numbers of Boston hardwood floor finishing businesses are owned and operated by Vietnamese immigrants. The Dorchester-based economic development agency Viet-AID recently found that, of 144 flooring contractors registered in Boston, 127 have Vietnamese surnames. It is likely that many other companies are unregistered.

With little access to training in finishing techniques or health and safety, and virtually no Vietnamese-language information on the industry and its hazards, many of these companies rely on word-of-mouth and product distributors for advice on products and practices. Yet, some distributors do not stock or promote safer products.

Viet-AID's experience with floor finishers supports NEI's: in the absence of adequate training, many floor finishers lack confidence in the quality of water-based finishes. Some floor finishers report that they are neither as shiny nor as durable as oil-based finishes. Viet-AID and NEI have also heard this belief expressed about lower-VOC oil-based finishes. Some companies have reported that consumers have rejected water-based products or simply prefer the appearance of floors finished with lacquer sealers followed by oil-based finishes. These beliefs also highlight the need for education and outreach to consumers as well as businesses about product options.
Small companies may also lack understanding of the cost-benefit tradeoffs of using non-flammable products. As described above, much faster drying times can allow companies to perform more jobs with water-based products over a shorter period of time. Reduced needs to vacate homes and buildings, lower levels of solvent vapors, and fire prevention also increase the attraction of these products for consumers. However, the greater cost of water-based products ($30-$90 per gallon versus $10-$30 of oil-based finishes) and the more difficult application may leave floor finishers with the impression that these products are less profitable to use.

g. Resources and Opportunities

Recent legislation has proposed licensing of hardwood floor finishers, sanders and installers as a mechanism for improving the safety of floor finishing for homeowners and building occupants as well as contractors and their employees. Licensing would allow

the Department of Labor and Workforce Development to prescribe requirements for licensure, which could include training and demonstrations of competency, oversight by a board, and fees and registration charges. Such required training would provide opportunities to disseminate information on selecting new and improved products, equipment and best practices.[14] [15]

One advantage of licensing is the opportunity to require health and safety training. A study conducted by the Center to Protect Workers' Rights showed that mandatory training of painters led to improvements in use of fans and respirators.[15] Potential drawbacks of licensing might include discrimination, driving of businesses underground to avoid fees and requirements, and the creation of a two-tiered system.[16] The integration of affected communities and their organizations in the development of licensing regulations will help avoid these consequences and produce more effective change.

The Vietnamese-American community is rich in social and business networks. Organizations such as Viet-AID have an accomplished history of improving the economic and occupational prospects of Vietnamese-American workers. Viet-AID is committed to improving both the safety and economic viability of hardwood floor finishing. This organization boasts expertise in small business development, purchasing cooperatives, marketing and outreach, translation, and adult education.

Viet-AID leaders have developed extensive trust and respect in the community. To date, they have identified several local business owners and distributors who are interested in working with them to improve hardwood floor finishing.

The Massachusetts Toxics Use Reduction Institute (TURI) has taken national leadership in the identification, development, and testing of environmentally preferable products. TURI's specialties include surface coatings. Safer and healthier products used in households are actively promoted through TURI partners such as New Ecology, Inc., whose Green CDCs program assists Massachusetts community development in developing healthy homes.

Viet-AID found that some 70 of Boston-registered floor finishing companies operated by Vietnamese-Americans are based in Dorchester. The Dorchester Occupational Health Initiative (DOHI), an environmental justice project funded by the National Institute of Environmental Health Sciences, is charged with outreach and education designed to improve the environmental and occupational health of Vietnamese-American floor finishers, nail salon workers, and other specific groups.

DOHI partners include Viet-AID, NEI, the Massachusetts Coalition for Occupational Safety and Health, UMass Lowell, and Bowdoin St., Dorchester House, and Codman Square Community Health Centers. This unusual combination of community-based organizations, safety and health advocates, health centers, and academic researchers permitted the synthesis of experience and information presented in this report.

Over the next year, DOHI will focus on developing linguistically and culturally appropriate outreach and education materials for Vietnamese immigrants in the hardwood floor finishing sector in Dorchester. DOHI will also strive to support leadership circles of small businesses and distributors interested in improving health and safety in this industry. These activities represent an important resource for the Commonwealth in preventing further fires caused by floor finishing and providing a mechanism to promote products with fewer health and environmental effects.

The Massachusetts Division of Occupational Safety (DOS) oversees licensing of asbestos and lead contractors. The OSHA Consultation program within DOS can provide free assistance to small businesses. Forms of assistance include on-site air monitoring, evaluation of Hazards Communication Programs, electrical safety, flammable liquids safety, personal protective equipment, and other compliance issues, and training on all aspects of health and safety.

3. DETAILED RECOMMENDATIONS

1. Establish a licensing program for floor refinishing businesses, as proposed in House Bill 3375. To ensure that the program is effective and accessible to people from diverse cultural and economic backgrounds, take immediate steps to form an oversight committee which comprises all affected stakeholders, including workers, small businesses, community organizations, labor unions, and environmental and health and safety experts.

   a. Involve community-based organizations, labor unions, homeowners, small businesses, and other local floor finishing businesses together with the appropriate state agencies in developing licensing requirements and packages of incentives.

   b. Include requirements for using dust collection systems, labeled products, and proper protective equipment; receiving and providing training on products and alternatives, fire prevention practices, and protective equipment; proper handling of waste and dust; proper storage of products; labeling all containers to which products are transferred.

   c. Develop a list of safer and healthier products and practices that is more extensive than a list of minimum requirements for licensing. Of this list, define minimum numbers and types of specifications that are required for licensing. Define additional numbers and types of specifications for which compliance would qualify businesses for "Green Business" certification.

   d. Publicize licensing requirements to employers, consumers, contractors, and public agencies. Include formats, venues, and languages accessible to contractors.

   e. Require contractors to provide information about options and impact of each product to be presented to homeowners.

   f. Maintain lists of licensed contractors on the Commonwealth of Massachusetts website

2. Require the use of non-flammable floor finishing products with flash points at or above 100° F in place of flammable products with flash points below 100° F. Require both sales and use of non-flammable products.

   a. Prohibit sales of flammable floor finishing products for indoor use. Require that products sold for indoor use have flash points > 100° F.

   b. Prohibit use of flammable floor finishing products indoors. Require substitution with products with flash points > 100° F. Institute small business assistance and incentive programs to help floor finishers avoid the use of flammable sealers.

   c. Fund the Massachusetts Toxics Use Reduction Institute (TURI) or other appropriate agency to develop standardized product labels in languages understandable to the majority of users, with symbols or color-coding where appropriate.

   d. Require that products sold in Massachusetts have standardized, understandable labels with sufficient warnings in understandable languages, and that they be used on containers that have products transferred to them.

   e. Require standard multi-lingual labels for all flammable floor finishing products indicating that they are prohibited for indoor use in Massachusetts.

3. Actively promote the purchase of safer products and encourage sustainable practices:

a. Establish economic supports for floor finishers to meet licensing requirements, such as small business grants, matching grants, loans, tax credits, and reductions in insurance rates.

b. Promote state procurement through the Massachusetts Environmental Purchasing Program and consumer purchasing by enacting requirements for those participating in state housing rehabilitation programs.

c. Provide tax credits for distributors according to proportion of safe products stocked in their warehouses or sold.

d. Require consumers participating in housing rehabilitation grant and loan programs to use preferred products.

e. Develop a list of safer and healthier products and practices that is more extensive than minimum requirements for licensing. Define numbers and types of specifications that are required for licensing, and additional specifications for which compliance would qualify businesses for "Green Business" certification.

f. Provide grants and loans to community development corporations, the Toxics Use Reduction Institute, and other organizations to provide linguistically and culturally accessible technical assistance, training and loan funds for "greening" of small businesses. This includes bulk purchasing, purchasing cooperatives, and marketing.

g. Maintain and publicize lists of contractors with green certification for new homeowners, renovators, housing agencies, and consumers.

h. Encourage Green Buildings guidelines to include hardwood floor finishing practices and products in their point systems.

4. Partner with the Dorchester Occupational Health Initiative to develop, distribute, and promote culturally and linguistically training materials on safer and healthier products and practices. Extend these efforts throughout the Commonwealth.

a. Disseminate and promote educational materials and training programs on hazards and safe, high quality alternatives in floor refinishing.

b. Target these audiences in the design and dissemination of information: the general public, product distributors, contractors, public agencies, and floor finishers.

c. Distribute the materials through public safety agencies, economic development agencies, small business services, housing agencies, and public housing programs.

5. Protect and Educate Consumers

a. Require contractors to provide information about options and impact of each product to be presented to homeowners.

b. Implement an outreach program to inform the public about hazards and alternatives in floor finishing; licensing requirements; fire prevention; green certification; and consumer rights and responsibilities.

c. Target retail outlets and media aimed at people planning to renovate their homes, and contractors in sectors where floor finishers are subcontracted.

6. Promote Research

a. Contract or perform full cost/cost-benefit accounting for standard and alternative products (including fire prevention, VOC air pollution, lead dust, length of time that rooms with finished floors must be evacuated, etc.).

b. Provide grants or loans for process innovation research.

c. Form an ongoing public/private task force for the identification and development of safer wood finishing products and practices

4. APPENDICES

a. News Reports

"Solvents Can Be Deadly, So Choose Alternatives"
The Toronto Star November 17, 1991, Pg. E1
BY R.G. CONDIE SPECIAL TO THE STAR

On Oct. 18, The Toronto Star reported the death of two men.

While they were applying a lacquer finish to a new, unfinished, hardwood floor a fire had broken out; then there was an explosion.

Ching Chan died of a suspected heart attack after helping his friend out of the burning building.

The friend, Chung Chow, died later from third degree burns to 95 per cent of his body.

"The force of the explosion was so great it blew most of the brick off the back of the house and gutted it from basement to roof," Sergeant Miles of York Region police told reporters.

What makes this tragedy even more disturbing is that it did not need to happen. The homeowner might have taken advantage of the many prefinished hardwood installations available today. Or he could have used a water-based finish and stain, instead of one containing deadly solvents.

In August of this year, Nick Parashakis was working in his basement when solvent vapors from a lacquer floor-finishing job ignited. The floor being finished was in a room in another part of the house.

When he ran dazed from his burning home, a knowledgeable neighbor placed Parashakis under a shower to cool and stop the burning.

Parashakis was hospitalized in critical condition, suffering second degree burns to his upper body, with burns to his back, chest and arms. His eldest daughter was also examined as her hair and eyebrows were singed. Both have since recovered from the trauma.

But damage to the home was estimated at $ 200,000, from what Mississauga fire chief Gordon Bentley termed a "major fire."

"The two alarm fire gutted the basement and spread up the open staircase and through walls to the main and second floors," Bentley said. Again, this fire could easily have been avoided.

I looked up the Yellow Pages, found a firm advertising the use of waterborne stains and finishes, and called Hermann Kerckhoff of Hermann Flooring.

Kerckhoff confirmed that when he does a job for a customer he uses BonaKemi water-based products for his own safety, both from toxic fumes and flash fires.

He is also able to complete a floor job without having to ask his customer to turn off all sources of flame and electrical spark and vacate their building for days.

Kerckhoff uses Pacific Strong, part of the Pacific Finishes line, which is formaldehyde free, odor-free, non-flammable, resistant to most chemicals, giving a no-wax finish which will not "amber" or yellow with age as lacquers do.

It is available to the public in Toronto from Barwood Flooring.

This product is only one of a number of water-based alternatives to the explosive nitrous-cellulose wood finishes that caused the preceding tragedies. Some other examples:

In 1990, Mel Thompson of North York was heating a solvent-based driveway sealer on his stove when it caught fire, burned his face and arms, and did an estimated $ 125,000 worth of damage to his home.

Jerome Chambers of King City was using a welding torch in the same room as a can of contact cement, when flames arced, ignited the can, eventually doing $ 60,000 worth of damage to his new kitchen.

Open windows

Solvents are deadly.

They are often both toxic and explosively flammable. Cans of contact cement, wood fillers, wood finishes, caulking, floor cements and a range of other products all prominently display the warning logos provided by the Federal Department of Consumer and Corporate Affairs.

Believe the warnings. These products are dangerous.

Heed the advice about turning off all sources of flame or spark, about ventilation, and safety.

Warnings to ventilate are too often ignored during Canadian winters, with tragic results. Solvents creep. They will leave the source, move lower and across floors, accumulating in unventilated rooms until often the slightest spark sets them off to flash back to the unsuspecting user.

One fire marshal recounted the story of a woman using gasoline to wash off rubber gloves.

The fumes left the gasoline-filled pan in her kitchen sink, crept downstairs to find her furnace pilot light, then flashed back to light the pan and her gloves.

With few exceptions today, whenever a consumer is offered a solvent-based product, there is an available water-based latex, or silicone, non-toxic, non-flammable alternative.

In the case of the floor finishes, Chan and Chow saved about $60 a gallon.

On the other hand, Chambers could have been safe with a product costing more per can but really less expensive because it offers greater coverage. Latex-based contact cements tend to also be more resistant to heat and water, once cured.

Many alternatives

With a few minor exceptions, The Borden Company is phasing out all solvent-based products.

Lepages offers homeowners and contractors non-toxic, non-flammable water-based contact cements, deck and furniture stains, wood stains, concrete floor coatings, wood fillers, textured coatings, spackling compounds, silicone-based sealants, and caulking. In the past six months it has introduced a line of floor adhesives to safely apply just about any kind of flooring.

Chembond also makes a water-based contact cement, has an established line of flooring cements, and is the only one I know who makes a latex-based wall panel adhesive.

Flecto makes a water-based Verathane.

There is no excuse for putting anyone's life in danger from flash fires or toxic fumes.

There is no excuse for subjecting the environment to unnecessary toxic solvent fumes.

The alternatives are available. If you can't see them on your dealer's shelves, ask for them.

Our federal government is recognizing the problems, and tightening Volatile Organic Compounds (VON) regulations and labelling requirements.

But unless Canadians want to go the way of Californians and ban the sale and use of solvent-based products, because of damage to the environment, the choice of what to use remains with the consumer.

"Man Badly Burned in Explosion Police Say a Pilot Light Apparently Ignited Fumes in a Room Where He Was Refinishing the Floor"

The Post-Standard (Syracuse, NY*)*, August 28, 1998, Pg. B3

BY PETER ORTIZ The Post-Standard

A man suffered severe burns Thursday in an explosion at a north side apartment he was helping to renovate, Syracuse fire officials said.

Steve LeBeau, 49, of Manlius was refinishing the floor of Apt. 5 at 1817 Burnet Ave. when the explosion blew out a window in the six-unit building about 6:40 p.m., Deputy Chief George Hart said.

LeBeau ran from the building screaming, said John Steves, a painter who was outside the building. The fire was out, but LeBeau's clothes had disintegrated in the blast, Steves said.

LeBeau was listed in critical condition early today at University Hospital, a nursing supervisor said. He suffered burns over his entire body, Hart said.

Syracuse police said LeBeau, who runs Hardwood Floors by Steve LeBeau, was using a lacquer varnish to finish a wood floor when the fumes ignited. Police said preliminary indications are that a stove pilot light caused the blast.

It appears the explosion was accidental and that the room was not properly ventilated, police said. Steves said LeBeau had told him there was no ventilation.

The apartment LeBeau was working in sustained extensive fire damage, Hart said. Other apartments sustained minor damage.

Patricia Parker said she was in an apartment beneath LeBeau when she heard the blast. She went outside, where she saw LeBeau.

"I grabbed wet towels and applied them to his bones," Parker said. "I never saw anything like it, and I hope I never do anymore."

LeBeau remained conscious, Parker said. Donald Christian Sr., who works for Steves Painting and Decorating, said the varnish caused major damage to LeBeau's skin.

Steves said he has known LeBeau professionally for more than 20 years and was a little shocked at how the explosion could occur.

"I really feel sorry for the guy," Steves said. "If you knew him you would think he is a prince of a man."

“Manlius Man Dies of Injuries from Blast”
The Post-Standard (Syracuse, NY), September 2, 1998, Pg. B3
BY PETER ORTIZ

A 49-year-old Manlius man, burned in an explosion Thursday, died Tuesday night.

Steve LeBeau was refinishing an apartment floor with a lacquer varnish at 1817 Burnet Ave., Syracuse, when vapors touched off an explosion.

Syracuse fire investigators said a pilot light from a stove ignited the fumes. LeBeau was at University Hospital when he died, a nursing supervisor said.

“Super Escape in Building Blast”
Daily News (New York), July 29, 2004, Pg. 26
BY TONY SCLAFANI and MELISSA GRACE DAILY NEWS STAFF WRITERS

A BUILDING SUPERINTENDENT leaped from a third-floor window in Brooklyn yesterday, narrowly escaping a flash explosion caused by trapped polyurethane fumes, officials said.

Samuel Cantres suffered only a broken arm after falling 20 feet to the concrete floor of a garden behind the Brooklyn Heights co-op at 40 Clinton St., officials and neighbors said.

The 2 p.m. blast was so powerful, it punched a wide hole into the apartment next door and knocked a woman across her living room in a third unit on the floor.

"I'm just happy to be alive," said Sandy Phillips, who was shaken but otherwise unhurt.

The 43-year-old super was refinishing a parquet floor in apartment 3P with a polyurethane seal when the room went up in flames, said George Perez, the building's handyman.

The cause of the fire is under investigation but officials said it appeared the room had not been properly ventilated. Fire officials said the explosion could have been ignited by a flame or an electrical discharge.

"With the fumes, one spark will cause what happened," said Deputy Chief Peter Campbell, adding Cantres was fortunate he was not burned and "lucky he was only working on the third floor."

Cantres, a father of four, was in serious but stable condition at Bellevue Hospital yesterday, officials said. While the vacant studio apartment was charred, the neighboring homes that were damaged did not burn. Building Department officials said the 12-story co-op suffered no structural damage and that no one was evacuated.

An upstairs neighbor said his place was undisturbed.

"It's unbelievable, none of my pictures, none of the lamps, were askew," said Victor Strammiello, 69.

“Worker Burned in Fire at Jackson's Ranch”
The Associated Press
November 1, 1993, Monday, AM cycle
DATELINE: LOS OLIVOS, Calif.

A fire damaged an office at Michael Jackson's lavish Neverland ranch Monday, burning a worker and sending a Jackson employee to the hospital for treatment of smoke inhalation.

The fire was started by a worker who was refinishing a hardwood floor with a flammable liquid, said Santa Barbara County fire Capt. Charlie Johnson.

"As he was scrubbing the floor with steel wool he went right over a brass electrical plate," Johnson said. "The fibers from the steel wool apparently ignited and because of the vapors in the air it started a flash fire."

The 27-year-old worker was treated at Santa Ynez Hospital for second-degree burns on both hands. A 31-year-old woman who works at the ranch was treated for smoke inhalation.

The fire caused $ 5,000-$ 7,000 damage to the 600-square-foot office and an adjacent reception room. The extent of damage to the rooms' contents wasn't known.

Jackson was in Mexico City on Monday as part of his "Dangerous" world concert tour. The ranch 100 miles north of Los Angeles features such attractions as a zoo, giant Ferris wheel and water slide.

News 4 Texas At Nine, July 13, 2002, Saturday PM
KDFW-TV
Video Monitoring Services of America
Explosion. A Chemical explosion in Mesquite happened today on Paddy Street. They were refinishing a hardwood floor it ignited a flash fire more than an explosion. Interview -Mark Noble, Fire Dept describes what happened. I ;Varlene Cox says she is not worried about the house but the people involved. All three men were seriously burned and rushed to the burn center at Parkland Hospital.
Graphic - Jeremy Groom is in critical condition, Thomas Smith is in Critical Condition and Vincent Pineda is in Serious condition.

b. Article on Lacquer Sealers

woodfloordoctor.com
http://www.woodfloordoctor.com/_product_reviews/articles/lacquerfinishfloorfires.shtml
accessed September 7, 2005

"Lacquer Finish Floor Fires"

I hope the title of this article alarms you because every time I get news of another lacquer floor fire it brings me back about 21 years ago when a floor caught on fire right under my nose. I'll return to this later.

This first year of the millennium has been a busy year for most of us floor sanders but it seems we are still using a finish developed about 80 years ago, when high production was regularly sacrificed for safety and health. Most lacquer finishes and their poorer cousins the lacquer sealers are made from nitrocellulose (which is basically cotton and wood fibers dissolved in acids) alkyd resins and plasticizes. But it's the addition of lacquer thinner that makes this stuff so fast drying and explosive.

High solids content lacquers like Pro Fabulon (at 26%) contain enough non evaporated material that it was used at first as a tough bowling alley finish. Its fast drying properties made quick work of the coating so the lanes could be used the next day. Lacquer sealers were used as a replacement for shellac as a quick dry finish to provide a base for floor varnishes. Lacquer sealers were mopped on with a lamb's wool applicator and allowed to dry overnight. The next day you could easily buff the lacquer smooth and provide the scratches needed for the next coat of polyurethane varnish. This allowed for the floor finishing operation to be completed in just two days. But why stop here why not figure a way to put on even less finish and get a job done in one day?

Now days the very cheapest of the wood floor refinishes merely apply 2 very thin skim coats of lacquer sealer using a drywall trowel and wait 15 minutes for it to dry. Then they happily coat the floor with polyurethane and declare the shiny job done and put their hand out for the check. Now, this one day finish hasn't left time for the lacquer solvents to release and the slippery polyurethane can't get a grip on the unsecured sealer. Unfortunately these sealers are much softer than the top coat and make the harder polyurethane suffer from impact cracking. Imagine a sheet of ice covering an unfrozen mud flat, it looks safe enough until you put your foot down on it. As the polyurethane layer cracks the sealer underneath provides almost no moisture protection and after a few water spills and washings the floor starts turning gray in ever growing patches. Does this sound familiar? And then most people blame the polyurethane when the fault lies not in the product but the process (remember Doc's motto at the top of the Home page?)

But I digress. It was brought to my attention to me by my favorite carpenter that Toronto has been experiencing some rather nasty and tragic floor lacquer fires. On July 12 this year a 62 year old floor finisher named Albert Ernst was burned to death as he was applying a lacquer sealer to a basement parquet floor. His helper and the owner, by only 5 seconds, missed a fiery death as the helper came upstairs to fetch the Ephraim Gale to

bring him to see the first coat being applied. Mr. Gale yelled for Albert but the floor was burning like crazy and the smoke drove him and the helper out of the house. Even though windows in the basement were open Albert didn't realize that the solvents in lacquer are heavier than air and especially on a hot and humid day they will sink and be ignited by a pilot light, or even a spark from a fan motor used to blow the deadly fumes outside. Science lacquer sealers have a much as 80% solvent in them, a gallon of lacquer on the floor is like pouring 3 quarts of gasoline on your basement. There are arson laws against that but no restrictions on using lacquer sealers in a closed environment like your home.

I felt compelled to write this article when a few days later 68 year old Emilio Spina died with burns to 85% of his body in another lacquer basement fire. His assistant also suffered burns on his left arm and neck. It almost happened to me when 21 years ago while working for a cheap Toronto floor company. We were required to apply the lacquer sealer without the benefit of a respirator mask so I always had to supply my own. Being the newest on the crew and possessing the only mask I often had to do the nasty job of applying the lacquer with a drywall trowel on my knees. This time however I had unknowingly cut the doorbell wire with the disk on my floor edger that was incorrectly tucked under the quarter round. All I saw was a small spark of the 12 volt wire and mistook it for the many nail heads we commonly sand over. When I applied the lacquer to the front hall floor the steel tool went right to the edge where the exposed wire was and ignited the puddle of lacquer in front of me. I yelled FIRE ! and Tom the foreman came out to the top of the stairs and looked at the growing blue solvent flames at the foot of the stairs . I ducked into the room off the hall with no exit and wondered how long I should wait before I would have to smash the window to get out. But Tom, trapped upstairs got a bucket of water and heroically dashed it down the staircase onto the fire.

Well by luck or planning the full open bucket of floor lacquer was 15 feet down the narrow hall and the cool flame of the mostly alcohol fire didn't set the floor or any curtains ablaze. So the flame didn't get a chance to ignite the 4 gallons of flammable just a few paces away. The funny thing was that by the time Tom had thrown the water the fire was almost out anyway. And the damage to the floor was so minimal that we got out the sanders again and resanded the slight burned mark, shut off the electricity to the whole house and went on with cheaply finishing the floor. I suffered only some singed hair on my head and eyebrows and was more scared of the big boss's wrath than my brush with death.

Well I learned something, but not much because when I started my own company later that year in order to compete price wise we had to do the quick cheap and dangerous lacquer sealer jobs just to stay in business. It wasn't until about 3 years into my own operation that I was able to increase my prices enough to use polyurethane for all 3 coats, and decrease some of my risk. But as we got busier in the late 80's we started using a high quality lacquer finish called Pro Fabulon and it gave about the same durability as poly but we could do 2 or even 3 coats in a day. It has the same fire risk as any lacquer sealer so we are diligent about pilot lights and ignition sources. But I feel that I have been living on borrowed time. After the news about the horrendous deaths of my fellow floor mechanics I experienced a profound sadness. Imagine as I was nearing retirement (as

these probably men were) to die a needless death on the job. The only reason that you are required to use this highly flammable floor finish is because your client wants to save some money. As you are engulfed in flames and breathing in the noxious fire you know now that a cheap floor job is worth less than nothing compared to your life.

I'll be finishing out 4 remaining contracts this summer and early fall with the Pro Fabulon and this winter will only use the less flammable oil based poly And hopefully if I can raise my prices to cover the added material and labour costs I'll switch to using the non flammable Dura Seal 1000 water based finish.

September, 2005

c. Boston Fire Department Press Release

September 15, 2004

PRESS RELEASE

SAFETY BULLETIN
HAZARDS ASSOCIATED WITH HARDWOOD FLOOR REFINISHING

In light of the recent tragic event in Somerville regarding the death of two construction workers, the Boston Fire Department is issuing the following safety bulletin. This safety bulletin is designed to inform contractors, managers and homeowners to the potential hazards and dangers associated with hardwood floor installation and finishing/refinishing. Since 1995 the City of Boston has experienced more than 25 fires directly attributed to hardwood floor installation and refinishing. This resulted in a property loss value of over 1.5 million dollars. In the majority of cases the cause of the fire resulted from failure to follow the manufacturer's safety precautions in the handling, use and storage of the floor finishing chemicals.

The process of hardwood floor installation and finishing or refinishing involves the use of any number of the following kinds of products:

- **Adhesives** - For gluing wood flooring to concrete or other surfaces
- **Sealers** - Chemicals used to seal the wood surface after sanding
- **Surface Finishes** - These finishes remain on the surface of the floor and form a protective coating

Contractors must be thoroughly familiar with the manufacturer's instructions and safety precautions associated with the products in use. Building managers and property owners should question their contractor as to the type of finishing chemicals the contractor is planning on using. In particular they should request from the contractor a copy of the manufacturer's safety precautions and review those sections pertaining to flammability and health hazards.

Improper handling of these products may present the following hazards:

Fire or Explosion

The use of these chemicals in poorly ventilated or enclosed areas may cause a significant build-up of flammable vapors. A spark or open flame could ignite the vapors causing a fire or explosion.

Health and Environment

Refinishing can create a large amount of dust from sanding. There is also the potential for chemical emissions from the sealer or surface finish. These products contain organic solvents and other substances: polyurethane, urea formaldehyde and various resins.

Workers who improperly handle the products can be exposed to high levels of vapors.

Prolonged and repeated exposure may produce adverse health effects.

Safety Recommendations

- Always follow all of the manufacturer's safety precautions.
- All open flames and sources of ignition that may be present or within the heating or ventilation systems must be eliminated (example: pilot lights, electrical motors, open flame or smoking).

• Adequate ventilation must be provided per the manufacturer's recommendation.
• Adequate respiratory protection shall be provided and used.
• Less flammable or non-flammable products should be used when available.
• Less toxic products should be used when available to prevent adverse health effects in workers.

The Law

Commonwealth of Massachusetts regulations to date:

Flammable Liquids used for Floor Refinishing

527 CMR 14.03 (6) allows recognized tradesmen or artisans to have and use 5 gallons of flammable liquids without obtaining a permit, provided it is removed from the building or structure upon completion of each working day.

They must have a suitable fire extinguisher of a least 1A-10BC rating available at all times.

527 CMR 14.04 (8) in locations where flammable vapors may be present, precautions shall be taken to prevent ignition by eliminating or controlling sources of ignition. Sources of ignition shall include open flames, lightening, smoking, cutting, and welding, hot surfaces, frictional heat, sparks, static (electrical and mechanical), spontaneous ignition, physical chemical reactions and radiant heat. The Head of the Fire Department shall prohibit the use of devices or order the suspension of an operation when proper precautionary measures are not taken.

Other sources of ignition: stoves, refrigerators, electric lights and switches, heating equipment, fans used for ventilation if not of the proper type.

BFPC 17.02 Permit Required

A permit shall be obtained for application of finishing materials by spraying, dipping or other means of which use of more than one gallon of flammable or combustible liquids or fluidized powders in any working day. No permit will be required for small, intermittent spraying operations for domestic or other incidental use unless required by the Head of the Fire Department when such operations are a major process of a business.

In closing this information is provided on the Boston Fire Department website at www.cityofboston.gov/bfd. Additional questions can be directed to the Fire Marshal at:

Boston Fire Department
Fire Marshal
1010 Massachusetts Avenue
Boston, MA 02118
Phone: 617-343-3402

d. New York City Fire Department Regulation

NEW YORK CITY FIRE DEPARTMENT
Notice of the Repeal and Re-Promulgation of 3 RCNY §20-01,
entitled "Storage and Use of Flammable and Combustible Liquids and Mixtures;"
the Repeal of 3 RCNY §20-08, entitled "Servicing of Bowling Alleys;"
and the Promulgation of a New Rule, 3 RCNY §28-05,
entitled "Storage and Use of Flammable and Combustible Floor Finishing Products"

NOTICE IS HEREBY GIVEN PURSUANT TO THE AUTHORITY VESTED in the Fire Commissioner of the City of New York by Section 489 of the New York City Charter and Sections 27-4057, 27-4058, 27-4063, 27-4066, 27-4067, 27-4070 and 27-4093 of the New York City Administrative Code, and in accordance with the requirements of Section 1043 of the New York City Charter, that the New York City Fire Department hereby repeals 3 RCNY §20-01, entitled "Issuance of City-Wide Permits for the Storage and Use of Approved Flammable Mixtures and Combustible Mixtures and/or Paints," and promulgates a new §20-01, entitled "Storage and Use of Flammable and Combustible Liquids and Mixtures;" and hereby repeals 3 RCNY §20-08, entitled "Servicing of Bowling Alleys," and promulgates a new rule, 3 RCNY §28-05, entitled "Storage and Use of Flammable and Combustible Floor Finishing Products." The entire rules are underlined to indicate that they are new.

A public hearing was held on March 13, 2002. In accordance with §1043(e)(1) of the New York City Charter, these rules shall take effect on October 1, 2002.

1. Section 20-08 of Title 3 of the Rules of the City of New York, entitled "Servicing of Bowling Alleys," is repealed effective October 1, 2002.

2. Section 20-01 of Title 3 of the Rules of the City of New York, entitled "Issuance of City-Wide Permits for the Storage and Use of Approved Flammable Mixtures and Combustible Mixtures and/or Paints" is repealed, and a new §20-01, entitled "Storage and Use of Flammable and Combustible Liquids and Mixtures," is promulgated, effective October 1, 2002, as follows:

§20-01 Storage and Use of Flammable and Combustible Liquids and Mixtures

(a) Applicability

This section applies to the general storage and use of any flammable and combustible liquids or mixtures, including paint, varnish, lacquer and other finishing products, except to the extent that such liquids or mixtures may be governed by other, specific provisions of the New York City Fire Prevention Code (Chapter 4 of Title 27 of the New York City Administrative Code) or Fire Department rules (as set forth in Title 3 of the Rules of the City of New York), including the rules governing the storage and use of paint, varnish, lacquer and other finishing products set forth in 3 RCNY Chapter 28.

(b) Definitions

Finishing product. Any paint, varnish, or lacquer, or other flammable or combustible liquid or mixture commonly used for painting, varnishing, lacquering, staining, waxing or other finishing operations.

(c) General Prohibitions

(1) It shall be unlawful to store:

(i) any flammable liquids or mixtures (other than volatile flammable oils and finishing products) in a quantity exceeding a total of five (5) gallons, without a permit issued by the Department. (ii) any volatile flammable oils (other than finishing products) in a quantity exceeding a total of one (1) gallon, without a permit issued by the Department.

(iii) any combustible liquids or mixtures (other than finishing products) in a quantity exceeding a total of ten (10) gallons, without a permit issued by the Department.
(iv) any finishing products in a quantity exceeding a total of 20 gallons, without a permit issued by the Department. (2) It shall be unlawful to use: (i) any flammable liquids or mixtures (other than volatile flammable oils) in a quantity exceeding a total of five (5) gallons, without a permit issued by the Department. (ii) any volatile flammable oils in a quantity exceeding a total of one (1) gallon, without a permit issued by the Department.
(iii) any combustible liquids or mixtures in a quantity exceeding a total of ten (10) gallons, without a permit issued by the Department.
(d) Permit Requirements
(1) Any person wishing to store or use flammable liquids or mixtures in an amount requiring a Department permit shall obtain one of the following Department permits prior to any such storage or use: (i) a site-specific permit, authorizing the storage and use of flammable or combustible liquids or mixtures at a specified construction site or other work location; and/or (ii) a city-wide permit, authorizing the storage and use of flammable or combustible liquids or mixtures at one or more construction sites
or other work locations in connection with painting, roofing, or other activities requiring such storage and use of flammable or combustible liquids or mixtures.
(2) A city-wide permit shall not be granted for:
(i) the storage or use of flammable and combustible liquids or mixtures at any one work location for more than 30 days; (ii) the storage or use of any volatile flammable oils at any one work location in a quantity exceeding a total of five gallons, or the storage or use of any other flammable liquids and mixtures at any one work location in a quantity exceeding a total of 250 gallons; (iii) the storage or use of any combustible liquids and mixtures at any one work location in a quantity exceeding a total of 300 gallons;
(iv) the storage or use of any finishing products (other than any volatile flammable oils) at any one work location in a quantity exceeding a total of 200 gallons, except as otherwise provided in 3 RCNY §28-05; or (v) the storage of any flammable liquid or mixture in any cellar, basement or other below grade location.
(3) All permit applications shall be submitted to the Department's Bureau of Fire Prevention at Fire Department Headquarters, with the required permit fee. The application shall contain such information and documentation as the Department may require, including, where applicable, the name, address and certificate number of the Certificate of Fitness holder responsible for supervising the storage and use of the flammable or combustible liquids and mixtures. (4) A copy of the Department permit authorizing the storage or use of flammable or combustible liquids or mixtures shall be available for inspection by the Department at each work location at which such liquids or mixtures are being stored or used. (e) Storage and Use Requirements
(1) The storage and use of flammable and combustible liquids and mixtures shall be in accordance with all applicable laws, rules and regulations, and the manufacturer's instructions.

(2) At a construction site or other work location involving activities requiring the storage and use of flammable or combustible liquids and mixtures, such liquids and mixtures shall be stored in a metal flammable liquid storage cabinet when not in use. Flammable or combustible liquids and mixtures may be stored on a roof in connection with work on a roof in a quantity not to exceed one day's supply, but in no event more than twenty gallons.
(3) All containers of flammable and combustible liquids and mixtures shall be kept closed when not in use.
(4) No smoking or open flames, including torches, shall be permitted in any area where flammable or combustible vapors may be present as a result of the storage or use of flammable or combustible liquids or mixtures.
(5) The area in which flammable or combustible liquids and mixtures are stored or used shall be kept free of debris and other combustible materials.
(6) Empty containers and all other wastes and residues of flammable and combustible liquids and mixtures shall be promptly removed from a work location not less than once a day.
(7) Portable fire extinguishers shall be provided at storage locations in accordance with the provisions of subparagraph (e)(2)(ix) of 3 RCNY §15-02, and at work locations in accordance with the laws, rules and regulations applicable to the activity being performed.
(f) Supervision Requirements
Where supervision by a Certificate of Fitness holder is required, a copy of the Certificate of Fitness of the person responsible for such supervision shall be available for inspection by the Department at the premises in which the flammable or combustible liquids or mixtures are being stored or used.
(g) Modification
Whenever circumstances, conditions, limitations, or surroundings are unusual, or such as to render it impracticable to comply with any of the forgoing provisions, the commissioner may waive or modify such provisions to such extent as he or she may deem necessary, consistent with public safety.
3. A new rule, §28-05 of Title 3 of the Rules of the City of New York is promulgated, effective October 1, 2002, as follows:
§28-05 Storage and Use of Flammable and Combustible Floor Finishing Products
(a) Applicability
This section applies to the storage, for sale or for use, and use of flammable and combustible floor finishing products.
(b) Definitions
Floor Finishing Product. Any flammable or combustible liquid or mixture used for any floor finishing operation, or formulated, marketed or otherwise intended for such use, including but not limited to any paint, varnish, lacquer, stain, or wax.
Floor Finishing Operation. Any activity involving the finishing of a floor, including but not limited to cleaning, stripping, sealing, painting, varnishing, lacquering, staining and waxing.
(c) General Prohibitions. It shall be unlawful to:
(1) use indoors any flammable floor finishing product with a flashpoint below
80 degrees Fahrenheit.

(2) use for any floor finishing operation any flammable floor finishing product or products in a quantity exceeding a total of five (5) gallons, without a permit issued by the Department.
(3) use for any floor finishing operation any combustible floor finishing product or products in a quantity exceeding a total of ten (10) gallons, without a permit issued by the Department.
(4) in conjunction with a floor finishing operation, store any floor finishing product or products in a quantity exceeding a total of twenty (20) gallons at the work location in which such floor finishing operation is being conducted.
(5) store at any other location any floor finishing product or products in a quantity exceeding a total of twenty (20) gallons, without a permit issued by the Department.
(6) smoke or have an open flame, including a torch, in any room or other enclosed area in which a floor finishing product is being stored, or in which a floor finishing operation is being conducted.
(7) conduct any floor finishing operation in any room or other enclosed area occupied by persons other than the individuals engaged in the floor finishing operation.
(d) Permit Requirements
(1) Any person wishing to use, for any floor finishing operation, any flammable floor finishing product or products with a flashpoint of 80 degrees Fahrenheit or higher, in a quantity exceeding a total of five (5)gallons, or any combustible floor finishing product or products in a quantity exceeding a total of ten (10) gallons, shall obtain one of the following Department permits prior to any such use:
(i) a site-specific permit, authorizing the use of floor finishing products for floor finishing operations at a specified work location, and the incidental storage of floor finishing products in a quantity not to exceed a total of 20 gallons.
(ii) a city-wide permit, authorizing the use of floor finishing products for floor finishing operations at one or more work locations, and the incidental storage of floor finishing products in a quantity not to exceed a total of 20 gallons at any one work location, provided that no floor finishing operation exceeds 30 days in duration.
(2) No permit shall be issued for the indoor use of any flammable floor finishing product with a flashpoint below 80 degrees Fahrenheit.
(3) Any person wishing to store any floor finishing product in a quantity requiring a Department permit, at any location where such storage is lawful, shall obtain a Department permit in accordance with the provisions of 3 RCNY §20-01 prior to any such storage. No permit shall be issued for the storage for retail sale of any floor finishing product having a flashpoint below 80 degrees Fahrenheit, unless:
(i) a conspicuous and durable tag bearing the words, “WARNING:INDOOR USE OF THIS PRODUCT IS PROHIBITED IN NEWYORK CITY,” is securely attached to each container of the floor finishing product; and (ii) a sign is conspicuously posted in the area in which the floor finishing product is displayed warning that the product is prohibited for indoor use in New York City.
(4) All permit applications shall be submitted to the Department's Bureau of Fire Prevention at Fire Department Headquarters, with the required permit fee. The application shall contain such information and documentation as the Department may require, including the name, address and certificate number of the Certificate of Fitness

holder responsible for supervising the floor finishing operation and/or the storage and use of floor finishing products.
(5) A copy of the Department permit authorizing the storage or use of floor finishing products shall be available for inspection by the Department at each work location at which such products are being stored or used. (e) Floor Finishing Operations
(1) Floor finishing operations shall be conducted in accordance with the manufacturer's instructions for the storage and use of floor finishing products.
(2) Any flammable or combustible liquid or mixture, other than floor finishing products, stored or used in connection with floor finishing operations shall be stored or used in accordance with the provisions of 3 RCNY §20-01 or other applicable requirements.
(3) No smoking or open flames shall be permitted during floor finishing operations. All cigarettes and open flames shall be extinguished prior to commencing work.
(4) No gas-burning equipment shall be operated during a floor finishing operation. Gas burners, pilot lights and other such sources of ignition shall be shut off prior to commencing work.
(5) No electrical equipment or device which could be a source of ignition of floor finishing product vapors, including but not limited to switches and outlets, shall be operated during a floor finishing operation. Precautions shall be taken prior to commencing work to prevent inadvertent operation of such equipment and devices, such as unplugging equipment and taping over switches and outlets.
(6) The room or other area in which a floor finishing operation is to be conducted shall be ventilated to the outdoors, and precautions shall be taken prior to commencing work to prevent the accumulation of flammable floor product vapors in other portions of the building. Mechanical ventilation adequate to prevent the accumulation of ignitable
vapor-air mixtures shall be provided whenever a flammable floor finishing product is being used. Such mechanical ventilation shall be kept in operation at all times while the floor finishing operation is being conducted and for a time thereafter sufficient to exhaust all ignitable floor finishing product vapors to the outdoors.
(7) Floor finishing operations in a room or other enclosed area shall be conducted only when such room or area is unoccupied by persons other than the individuals engage in the floor finishing operation. No one shall be permitted to enter the room or other enclosed area until the floor finishing operation has been completed and the room or area is clear of ignitable floor finishing product vapors.
(8) The quantity of floor finishing products stored and used at any location at which a floor finishing operation is being conducted shall be no more than is necessary to complete the floor finishing operation, and in no event shall such quantity exceed a total of 20 gallons of floor finishing products.
(9) Floor finishing product containers shall be kept closed when not in use.
(10) Empty containers of floor finishing products, and all other floor finishing product wastes and residues shall be promptly removed from the premises not less than once a day.
(11) At least one portable fire extinguisher having a minimum rating of 20-B shall be provided and shall be immediately accessible during floor finishing operations, with the travel distance to such fire extinguisher not to exceed 30 feet.
(f) Supervision of Floor Finishing Operations
Floor finishing operations shall be under the personal supervision of a person

holding a Certificate of Fitness for the Storage and Use of Flammable and/or
Combustible Liquids whenever more than five (5) gallons of a flammable floor finishing product or more than ten (10) gallons of a combustible floor finishing product are to be used in a floor finishing operation.

(g) Modification

Whenever circumstances, conditions, limitations, or surroundings are unusual, or such as to render it impracticable to comply with any of the forgoing provisions, the commissioner may waive or modify such provisions to such extent as he or she may deem necessary, consistent with public safety.

STATEMENT OF BASIS AND PURPOSE OF RULE:

In recent years, there have been an increasing number of fires and serious injuries associated with floor finishing operations. The use of quick-drying but highly volatile floor finishing products has highlighted the need to regulate flammable and combustible products that are used for cleaning, stripping, sealing, painting, varnishing, lacquering, staining, waxing or otherwise finishing floors.

The new floor finishing products rule, 3 RCNY §28-05, governs the storage and use of such products for floor finishing operations. The rule prohibits the indoor use for floor finishing operations of any flammable floor finishing product with a flashpoint below 80 degrees Fahrenheit, and prohibits the storage for sale of such highly volatile floor finishing products unless they are tagged, and a conspicuous sign posted, to indicate that such use is illegal in New York City. The rule also requires that floor finishing operations involving permitted amounts of floor finishing products be conducted under the personal supervision of a Certificate of Fitness holder.

The other provisions of the floor finishing products rule clarify the existing requirements for the storage and use of such products, currently set forth in Fire Department rules 3 RCNY §§ 20-01 and 20-08.

The rule also repeals and repromulgates the rule governing the storage and use of flammable and combustible liquids and mixtures generally, 3 RCNY §20-01, to reference the new floor finishing products rule and to clarify the existing requirements applicable to the storage and use of such liquids and mixtures.

If any paragraph, subparagraph or subdivision of this section shall be adjudged by any court or agency of competent jurisdiction to be invalid, such judgment shall not affect, impair or invalidate the remainder thereof, but shall be confined in its operation to the paragraph or subdivision directly involved in the controversy in which such judgment shall have been rendered.

20-01/28-05 (8/6/02)

5. ENDNOTES

1. Boston Fire Department Press Release, September 15, 2004. Safety Bulletin: Hazards Associated with Hardwood Floor Refinishing.
2. Census of Fatal Occupational Injury Data (CFOI), available at the Bureau of Labor Statistics, www.bls.gov
3. Narrative search of CFOI data, personal communication, Massachusetts Department of Public Health Occupational Health Surveillance Program.
4. Flanagan M. Wood floor refinishing – exposure and controls. Session 190 at the 2005 conference of the American Industrial Hygiene Association.
http://www.aiha.org/abs05/po125.htm accessed September 13, 2005
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