

## **Subject: Fire suppression systems**

Laramie Hickey-Friedman lhickey-friedman@menil.org, on behalf of Kelly Pike, writes

... Also, if any museums have already replaced their Halon systems we'd love to hear which system they choose and why.

I would highly recommend that you look into water mist fire suppression. It uses 10% as much water as normal sprinklers and has properties similar to a gas in that fine water particles are able get into small cracks and crevices within a room. In addition, the piping is flexible and takes up less space than a conventional sprinkler system.

Gas suppression only works well in very tight, sealed rooms with low ceilings that do not normally have windows and doors open to other rooms or to outside spaces. Inergen (a mixture of inert gasses) is usually preferred by most fire suppression specialists due to its low toxicity and relatively good fire suppression characteristics.

I recently did a research project on this topic and would recommend the following resources:

Alderson, Caroline and Nick Artim. "Fire-Safety Retrofitting: Innovative Solutions for Ornamental Building Interiors." APT Bulletin, vol. 31, no. 2-3 (2000): 26-32.

"Alternatives to Halon for Special Fire Hazard Fire Protection."  
HARC News (Halon Alternatives Research Corporation).  
URL:<http://www.harc.org/harcnews.html>

Artim, Nick. "Cultural Heritage Fire Suppression Systems: Alternatives to Halon 1301." WAAC Newsletter, Volume 15, Number 2 (May 1993): 34-36.  
URL: <http://palimpsest.stanford.edu/waac/wn/wn15/wn15-2/wn15-209.html>

----- "An Introduction to Fire Detection, Alarm, and Automatic Fire Sprinklers." Northeast Document Conservation Center Technical Leaflet: Emergency Management, section 3, leaflet 2. URL:<http://www.nedcc.org/plam3/tleaf32.htm>

NFPA 909: Code for the Protection of Cultural Resources. Quincy, MA: National Fire Protection Association, 2001.

NFPA 914: Recommended Practice for Fire Protection in Historic Structures. Quincy, MA: National Fire Protection Association, 1994.

Mawhinney, Jack and Christian Dubay. "Water Mist: What Is It?" NFPA Journal (Jul/Aug 1999): 26-30.

## **Subject: Fire damaged paintings**

At the end of last year, two fire damaged paintings (oil on canvas, late 18th century) from a church altarpiece were conserved at NIKU's studios in Oslo. Both had suffered extensive blistering of the paint layers. These damages were successfully consolidated and flattened by using a combination of localised heat and pressure. I am interested in learning more about the different practical approaches and experiences that other conservators have had with similar problems (especially concerning the issue of the reversal of large blisters). Equally, any knowledge of articles that have been published recently on this subject (the last 10 years or so), would be greatly appreciated.

Thierry Ford  
Paintings Conservator  
NIKU - Norsk Institutt for Kulturminneforskning  
Norwegian Inst. for Cultural Heritage Research

Postboks 736, Sentrum 0105 OSLO  
+47 23 35 5000/43  
Fax: +47 23 35 5001

+++++

A simple Google search at <http://www.google.com/> with "Fire damaged paintings" (exactly the way I typed is, so quotation marks INCLUDED) leads to numerous positive hits..

TC

+++++

## **Subject: Fire-damaged manuscripts**

A collection of musical scores composed in the 1930's were subjected to heat and water due to a major fire. This resulted in severe damage of the original manuscripts. The spines and covering materials are non-existing and many of the sheets have been fused together, most probably aided by the sizing in the paper. In addition, the brittle and distorted fragments, which are soot laden and charred around the edges, show evidence of mould on the surface.

A project has been initiated to catalogue and re-house these manuscripts. As a paper conservator, I have been asked to investigate whether it would be possible, through a conservation treatment, to separate those sheets which have been fused together. I have searched the conservation literature, but it seems that in general there is not a great deal literature on the conservation of fire-damaged paper.

However, based on the literature which I have found and conversations with other paper conservators, a method or technique, which involves the use of an enzyme bath in a water-solvent medium, might be considered to break the inter-sheet link adhesion between the fused together sheets. The media applied by the composer is water-soluble, hence the mixture of water and solvent.

Does anyone have experience with treating fire-damaged manuscripts where the sheets have been fused together into blocks which, when tapped on, resemble hard blocks of wood?

Also, I would be extremely grateful if anyone could point to relevant literature which could be useful in order to decide on the most suitable conservation treatment.

Anne-Grethe Slettemoen  
Nedre Stolen 3  
5003 Bergen  
Norway  
+47 55367486

## **Endangered Treasures: Curators vs. firefighters, there is no national policy on museum fire protection.**

Long-standing fire code violations at Art Museum leaves priceless works at risk

By Alfred Lubrano Inquirer Staff Writer MICHAEL PEREZ / Inquirer Staff Photographer

The Philadelphia Museum of Art has been in violation of the city fire code since 1952, one fire official said. It was not cited until 1995. Priceless art and firefighters' lives are potentially at risk because the basement storage level of the Philadelphia Museum of Art has failed to meet the fire code, city officials say. The museum's level B, covering more than two acres, holds paintings, sculptures, books, carpets, furniture, ceramics, china and silver, including works by Monet and Alexander Calder. In all, considerably more art is in storage than is on public display. Yet more than half of the vast basement has no sprinklers or other fire-suppression system - a fire-code violation - according to a fire-inspection report obtained by The Inquirer. And the fire-suppression system that is in place for the most valuable paintings and sculptures is inadequate, fire officials said. "The museum has been in violation of the city fire code since Jan. 2, 1952," said Capt. Tom Donovan, chief of the Philadelphia Fire Department's Fire Code Unit. That was when the current requirements were adopted. The museum was not cited for the violations until 1995, after the fire department began inspecting the building with officers trained in the code. Museum officials say they recognize the problems and for the third time in six years are asking for more time to remedy the violations. "This is a complex issue," said Anne D'Harnoncourt, the museum's director and chief executive officer. "Are we perfect? The answer is no. We understand that the violations are serious. We take what the fire department says very seriously." Fire and museum officials stressed that the museum does not pose a risk to visitors. "If we felt there was a threat to public safety we would close the building down," said John McGrath, deputy commissioner of the Philadelphia Fire Department. "If I didn't believe the museum was safe, I wouldn't encourage visitors to come," D'Harnoncourt said. She said the museum has state-of-the-art fire-detection equipment, 24-hour security, and a staff trained to handle emergencies. Since 1996, the museum has promised to make improvements but missed two deadlines, fire officials said. In June, the museum asked for - and was denied - a third extension, for 10 to 12 years. The museum was ordered to present an expedited plan by Sept. 24. The story of the violations casts a unique light on the neoclassical museum, one of the most popular of Philadelphia institutions. In the city, fire officials cannot name another basement level as large - or with as much burnable material - that is unprotected by sprinklers. In the cultural world, fire experts cannot name other museums that leave most of their art-storage areas unprotected. And it highlights a tension between art curators and firefighters - one group fearful of water, the other of fire. The problem has caught the eye of city officials; the city owns the museum building, but is not responsible for its maintenance. "We are not granting them the extraordinary length of time they've asked for" to meet the fire code, said city spokesman Frank Keel. "We concur [with the fire department] that the situation on level B is not acceptable from a number of standpoints." Beyond the threat to the art, the basement holds potential perils for firefighters. Level B is virtually windowless, which makes venting a fire almost impossible, fire officials said. "From what I saw, the museum is a deathtrap for firemen," Tony Hudgins, an official of firefighters Local 22 and a lieutenant in Engine Co. 41, said of a 1998 visit. Museum officials said it has taken longer than they thought it would to outfit an "idiosyncratic" 1920s-era building with modern safety equipment. Andrew Lins, chairman of the museum's conservation department, said it is difficult to move fragile art out of the way to install fire-suppression systems. "Moving collections is extremely labor-intensive and we haven't had the wherewithal in terms of staff," he said. "It also entails risks [to the art]." The Philadelphia fire code requires that only the museum basement have a fire-suppression system. None exists in the public galleries or in the offices. Those areas present less of a risk because they contain much less burnable material, fire officials said. Robert Morrone, director of facilities and operations at the museum, said it has made "substantial strides" in improving its fire protection. He added that "money is not the issue, although it's a consideration." Although the city and museum did not disclose the cost of the upgrade, an outside fire-safety consultant, John Kampmeyer, agreed to furnish a rough estimate. Kampmeyer, an engineer with Triad Fire Protection Engineering Corp. of Springfield, Delaware County, said that installing sprinklers and a gas-suppression system in an area the size of the museum's basement level could cost \$2 million to \$4 million. Companies that provide insurance for the museum said they were unaware of the problems. "This is all news to me," said Eric Fischer of Fine Arts Risk Management in Arlington, Va., which insures the museum's artwork. "I never heard of these fire-code violations." Asked how the company handles museums with such violations, he said: "It's never come up. Other museums we cover don't have fire-code violations." Kobie West, president of West Insurance Group, the Philadelphia company that serves as an insurance broker for the museum building, said he had been unaware of the violations and declined comment.

### **Asking for time**

Since 1996, the museum has been granted two variances - temporary suspensions of violations - by the Board of Safety and Fire Prevention, a group of seven fire professionals from the region, including McGrath. In late 1995,

the board found the museum in violation of the fire code and ordered it to improve a faulty alarm system and install sprinklers in basement levels B and C, fire department records show. The C level, underneath B, includes a garage, but not art, the records show. In April 1996, the museum asked for and was granted a variance, after agreeing to have the work done by June 1997. The work was not done by then, and the board gave the museum its second variance to improve the alarm system by March 2001 and have the sprinklers installed by June 2002, records show. Although the museum improved its alarm system and installed sprinklers in level C, the work in B remained undone. In June, the museum asked for a third variance, saying it would need 10 to 12 years to complete the required work, along with other building upgrades, McGrath said. The request was denied, and museum officials were told to devise a plan that would take less time, fire officials said. Museum officials are appealing to the board. "They presented a time schedule we didn't think was acceptable," said Roland Hall, a member of the safety board and a fire-code expert from Trevese, Bucks County. "Also, their missed deadlines went into my decision-making [to deny a third variance]. I can't think of another building that's gotten two extensions and come back and asked for more extensions."

D'Harmoncourt and Morrone said the board misunderstood the museum's timetable for improvements, which go beyond fire safety. While the whole plan may take 12 years - including upgrading plumbing and repairing a leaking roof - the fire-suppression system can be installed sooner, Morrone said. When? "If I had the answer to that question," he said, "I would have told the fire department." The city owns the museum building and some of the art; the nonprofit Philadelphia Museum of Art is designated as the city's agent for running the building, said Larry Copeland of the city's law department. Despite the difficulties, city spokesman Keel said that art-museum management has been "very cooperative" with fire officials in their efforts to bring the museum up to code and the city believes the situation "will resolve in due course." While the city's Department of Licenses and Inspections could fine the museum for violations, it has not. But the time it has taken for improvements has clearly rankled some fire professionals. In December 1991, following the fire in the 38-story One Meridian Plaza, landlords of 250 city high-rise commercial buildings were ordered to install sprinklers on every floor. Over an eight-year period, "compliance was almost 100 percent," McGrath said. In six years, the museum has not installed sprinklers in the art-storage areas of level B, he said. "The Philadelphia Museum of Art is creating a situation for itself that is unnecessarily hazardous," said William Richmond, Philadelphia fire commissioner from January 1984 to September 1988. A fire safety consultant for a Virginia firm, Richmond lives in Philadelphia. Over six years, Richmond said, "the museum certainly should have gotten its act together. There shouldn't be any reason for them not to comply with fire codes."

"The codes are there to protect, among others, our firemen. If anyone is hurt or killed [in a museum fire], you'll have litigation, guaranteed. And if it's discovered at trial that you've been in violation of the fire code, then you're a plaintiff lawyer's best friend."

#### **City firefighters echo the officials' concerns.**

"As part of our training, one thing they've talked to us about is the art museum, and we're shown the inadequate protection it has," said Hudgins, of Local 22. He was especially worried that the basement could not be vented. "There's nowhere for super-heated gases to go - except onto firemen," he said.

#### **Artwork at risk?**

Basement level B is a cavernous place filled with treasure. Museum officials declined to let a reporter tour it; neither would they specify what works are kept there. The art is stored in six areas inside the basement, which measures 115,248 square feet, safety board records show. About 30 percent of the basement has sprinklers, installed in 1994-95, to protect items stored for the museum-shop - not art. Almost 14 percent of the space uses halon, an odorless, colorless gas, to put out fires. The remaining 56 percent has no fire-suppression system. The area protected by a halon gas fire-extinguishing system installed in 1985 - which contains paintings, sculptures, carpets and tapestries - covers 15,634 square feet. No longer manufactured because it harms the ozone layer, halon suffocates a fire. By contrast, water cools a fire, then dampens nearby areas to prevent fire from reigniting. In all, 65,214 square feet of level B - larger than a football field - has no form of fire suppression, and has not had any since construction of the museum building was completed in 1928, fire officials said. One of the problems in the basement is "fire load" - a firefighter's term for the amount of material that will burn. "This is the largest basement fire load in the city - the largest I've ever seen," said Donovan, of the Fire Code Unit. Donovan said museum officials told him there are an estimated 3,000 paintings and 3,000 pieces of antique furniture in level B. "Parts of the basement have furniture from floor to ceiling, stacked just like in a lumber yard," said Donovan, who was there in June. "These are things from the last 1,000 years." The basement-level fire load consists of combustibles - wood, paper, canvas - which would produce what firefighters call a Class A fire. Water is the best means to put out a Class A fire, McGrath said. But in the area in which paintings are stored in wooden crates, the museum has chosen to use halon for protection.

Many other museums use halon as well, saying they fear art can be damaged by water from sprinklers that might accidentally discharge. Fire professionals believe halon is not as effective. "Halon is not designed for the Class A fire, which is the kind of fire the museum would have," McGrath said. Halon systems were developed especially

for putting out fires of plastics and flammable liquids, experts said. "I trust halon for [suppressing fire in] computer rooms, but not for artifact storage," said Nick Artim, a Vermont fire engineer who worked on the U.S. Capitol, the U.S. Supreme Court, and the Library of Congress. "Water is the best way to go. Gas may put the fire out. But the odds aren't with you." In addition, fire officials fear that the museum's halon system is too flawed to function properly. The gas works only if it is released into a sealed room. But level B has about 40 openings in the walls and ceilings from which gas can escape, according to the board report. "We're very leery of their gas system," McGrath said. Morrone took exception to the report. "The fire department doesn't know if the halon works or if it doesn't," he said. "We're testing those rooms." Fire experts said that even if the museum's halon system worked perfectly, it might not be effective. "A fire that starts in the unprotected part will overwhelm it," Richmond said. As part of its new plan, Morrone said, the museum will be adding a combination of sprinklers and suppression systems of gases that are more environmentally acceptable than halon. The museum's fire-suppression plan will more than fulfill code requirements, making the museum one of the safest in the United States, Morrone said.

### **Curators vs. firefighters**

There is no national policy on museum fire protection.

And there has always been a cultural divide between firefighters and curators, each camp with its own prejudices: fighting fire vs. saving art. Curators fear water accidentally being discharged from sprinklers; firefighters fear fire. "We are worried about a water deluge," Lins said. "It would be just as bad as a fire." As a result, facilities have different fire-suppression systems, although the trend over the last 10 years is toward installing sprinklers, said Andy Wilson, fire-protection engineer at the Smithsonian Institution, much of which has sprinklers. "There's better comfort among museum directors knowing museums like ours use sprinklers without adverse experience," he said. There are about 80 fires in museums and art galleries every year in the United States, according to the National Fire Protection Association in Quincy, Mass., a code-writing organization whose standards are adopted by cities throughout America, including Philadelphia. The Franklin Institute has sprinklers, as does Independence Hall, fire specialists said. Both the Getty Museum in Los Angeles and the Whitney in New York use sprinklers in art-storage areas, officials at each said. Many museums will not discuss fire protection, however, citing security. The National Gallery of Art uses gas systems rather than sprinklers for fear of water damage, said chief of conservation Ross Merrill. Merrill said all art-storage areas are protected. Danny McDaniel, an expert on museum fire codes who chaired a National Fire Protection Association committee on that subject, said the Philadelphia Museum of Art is extremely unusual. "I can't think of another large museum that doesn't have [fire suppression] in art storage," McDaniel said. In the battle between firefighters and curators, "there are no bad guys," said Kampmeyer of Triad. "It's people doing their jobs the best they know how." People erroneously believe all sprinklers go off at once, fire officials said. But the fire protection association said 70 percent of fires are controlled by four sprinklers or fewer.

And accidents rarely happen, according to Bob Tull, a manager for Chubb Group of Insurance Companies in Philadelphia, which insures museums. "In 20 years, maybe I've heard of one sprinkler head going off accidentally," he said. Kampmeyer said the probability of losing a collection to fire is greater than losing it to water damage. And, said Neil Cockerline, an expert on restoring damaged paintings from Minnesota: "I've never seen a painting with water damage that couldn't be restored."

<http://www.philly.com/mld/inquirer/news/local/4074509.htm>

---

## **City to audit Art Museum on fire safety**

By Alfred Lubrano  
Inquirer Staff Writer

City Controller Jonathan Sidel said last night that his office planned to audit the Philadelphia Museum of Art to assess its fire safety and determine whether city-owned art was being properly safeguarded. "We're going to do an investigative audit immediately," Sidel said of the museum, which is in violation of the city fire code. "The museum holds millions upon millions of dollars of city art." Museum officials would not comment last night, saying they had not received official word of Sidel's intent. "We'll reserve comment until and unless we hear from the controller's office," Anne D'Harnoncourt, the museum's director and chief executive officer, said through a spokesman. The city owns the museum building but says it is not responsible for its maintenance. Most of the art is owned by the nonprofit Philadelphia Museum of Art, which runs the museum. Sidel said the audit was spurred by an article Sunday in *The Inquirer*, which reported that more than half of the museum's vast basement art-storage level lacked sprinklers or other fire-suppression systems, in violation of the fire code. First cited for the violation in 1995, the museum has twice missed deadlines to bring the basement's B level up to code by installing a sprinkler system. In June, the museum requested a third chance, saying it could take 10 to 12 years, city officials said.

"I was surprised to see the severity of the noncompliance with city code," Saidel said. He added that the lengthy deadline extension the museum asked for was "unbelievable." The museum has said that its 10- to 12-year plan included plumbing and roofing work and that it would take less time to install sprinklers. Museum officials said the city misunderstood their timetable. Saidel said he planned to call in fire- safety, electrical and structural engineers to inspect the museum. The audit would be a performance audit, not a financial one. It would be one way to determine how well safety systems were functioning, and whether city assets were properly safeguarded, Saidel said. Among the city's holdings at the museum is the John G. Johnson collection of books and artwork. "God forbid someone should get hurt because of neglect," Saidel said. "Beyond the dollar amount of the art, thousands go to the museum and their lives could be in jeopardy, as well as the lives of firefighters." Officials from both the Philadelphia Fire Department and the museum stressed that the museum's basement fire-code violations did not threaten public safety. Should a fire start in the basement, a nonpublic area, the museum's fire-detection system would alert staff, who would safely escort people out of the building in time, fire officials said. But fire officials have long complained that the nearly windowless basement - filled with flammable art and lacking an adequate fire-suppression system - would be extremely dangerous for firefighters unable to vent the cavernous place. About 30 percent of the basement has sprinklers to protect items stored for the museum shop - not art. Almost 14 percent of the space uses a gas-suppression system to put out fires, but fire officials have questioned its effectiveness. Saidel also said he planned to take an inventory of city holdings in the museum to accurately account for the artwork. Saidel added that he planned to investigate whether the fire department or the Department of Licenses and Inspections should have closed the museum years ago for failing to meet the fire code. "We close places down every day if they're not up to code," he said. "Closing the museum might have forced them into compliance." Officials from L&I and the fire department could not be reached last night. Saidel said that the city should contribute to the cost of installing an adequate fire- suppression system in the museum - estimated to be \$8 million to \$10 million by museum board chairman H.F. "Gerry" Lenfest. But, Saidel added, the bulk of the cost should be borne by the museum. That is not how museum board member Julian Brodsky sees things. "Putting in a fire-protection system would be a capital expenditure and the city should be doing it, not the museum," said Brodsky, vice chairman of Comcast Corp. He would not comment on Saidel's announcement. Saidel said he could not say how long the audit might take.

<http://www.philly.com/>

---

## **Subject: Fire Drill Procedures**

From: "Tony Christoforou" [tony.christoforou@brooklynmuseum.org](mailto:tony.christoforou@brooklynmuseum.org)

Dear Colleagues,

We are in the process of reviewing our Fire Drill Procedures. It would be helpful to see other institutions' policies. If you are willing to share your written Fire Drill Procedures please e-mail them to me at [tony.christoforou@brooklynmuseum.org](mailto:tony.christoforou@brooklynmuseum.org) or fax them to my attention at (718)501-3631.

Thank you for your assistance,

Tony Christoforou

Assistant Manager- Security & Safety

200 Eastern Parkway

Brooklyn, New York 11238

Telephone-(718)501-6463