AASLH
TECHNICAL LEAFLET BUNDLE
A PUBLICATION OF THE AMERICAN ASSOCIATION FOR STATE AND LOCAL HISTORY

May Day Resources

BNDL021

This Technical Leaflet bundle was first created to help historical organizations take part in May Day: Planning for Disaster on May 1, 2008. However, as recent events have shown us, this topic continues to be important. After several national disasters, disaster planning has taken center-stage in our every day tasks. This bundle can help you prepare to handle the unexpected at your institution.

TL183 – Disaster Planning for Cultural Institutions (1993)
TL198 – Collections Care: What to Do When You Can't Afford Anything (1997)
TL206 –Protecting Cultural Heritage Properties from Fire (1999)
TL219 - Closing the Barn Door: Dealing with Security Issues
TL234 – Disaster Planning, Preparedness, and Recovery (2006)

This bundle may help institutions achieve the standards as set forth under the Stewardship of Collections, the Stewardship of Historic Structures and Landscapes, and the Management section of the AASLH StEPS Program.

A A S L H

TECHNICAL LEAFLET

AMERICAN ASSOCIATION FOR STATE AND LOCAL HISTORY

Disaster Planning for Cultural Institutions

by Beth C. Lindblom and Karen Motylewski

Natural disasters such as Hurricane Andrew's August 1992 assault on southern Florida and Louisiana make all of us acutely aware of our vulnerabilities to disaster. Fortunately, catastrophes of this magnitude are rare, but disaster can strike in many ways. For example, a broken water main inundated the Chicago Historical Society in 1986; fire severely damaged the Cabildo in New Orleans in 1988; the Loma Prieta earthquake damaged several San Francisco museums in 1989; smoke from an electrical fire covered collections throughout the Huntington Gallery in 1985; mold damage threatened Mount Vernon's archival collections. Large or small, natural or man-made, emergencies put an institution's staff and collections in danger.

In its twenty years of service, the Northeast Document Conservation Center (NEDCC) has advised hundreds of institutions through its emergency disaster assistance program (now a part of the field service program and largely funded by the National Endowment for the Humanities). It is unfortunate that conservation and museum professionals often learn about the advantages of emergency preparedness through hard experience, but an emergency does not have to become a full-fledged disaster. In fact, hazards can often be mitigated or avoided altogether by a comprehensive, systematic, emergency preparedness program. Such programs provide a means for recognizing and preventing risks, and for responding effectively to emergencies.

An increasing number of professionals know that small-scale emergencies can be contained if staff members are prepared to react quickly. Damage can be limited even in the face of a large-scale disaster. For example, cultural institutions in Charleston, South Carolina, formed a consor-

tium that focused on disaster preparedness several years before they were hit by Hurricane Hugo in 1989. Many of those institutions sustained only minor damage because they were able to activate their early-warning procedures.

Disaster planning is complex; the written plan is the end result of a wide range of preliminary

Historically appropriate drainage strategies are available for historic house museums. Note the wooden chute and the gravel bed used to reduce water in the basement of this nineteenth-century building. Photo courtesy of the Exeter Historical Society, Exeter, New Hampshire and Northeast Document Conservation Center, Andover, Massachusetts.

activities. The entire process is most efficient if it is formally assigned to an individual who acts as the disaster planner for the institution and is perhaps assisted by a planning team or committee. A museum director may play this primary role or may delegate the responsibility, but it is important to remember that the process must be supported at the highest level of the organization if it is to be effective. The planner should establish a timetable for the project and should define the scope and goals of the plan, which will depend largely on the risks faced by the institution.

For any museum or historical collection, the risk of disaster is a combination of environmental hazards plus the vulnerabilities of buildings, mechanical systems, and collections. An institution-wide risk survey is the best way to assess these factors. Research into past events and previous problems will also help identify dangers. An article of this length cannot cover all of the possibilities, but there are many helpful guides in interactive computer programs, published books and articles, and technical leaflets from regional conservation programs.

Identifying Risks

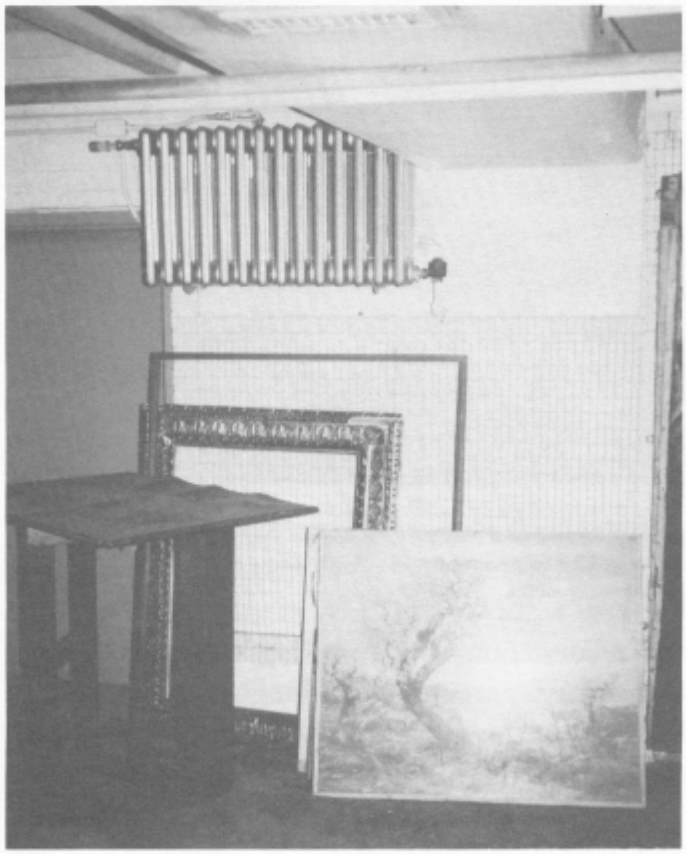
A prudent first step is to list geographic and climatic hazards and other risks that could jeopardize your building and collections. These might include your institution's susceptibility to hurricanes, tornadoes, flash flooding, earthquakes or forest fires, and even the possibility of unusual hazards such as volcanic eruptions. Consider man-made disasters such as power outages, sprinkler discharges, fuel or water supply failures, chemical spills, arson, bomb threats, or other such problems. Take note of the environmental risks that surround your institution. Chemical industries, shipping routes for hazardous materials, and adjacent construction projects all expose your institution to damage. While all institutions are not vulnerable to all disasters, any event that is a real possibility should be covered under your emergency plan.

Look carefully at your building and site. Check the surrounding terrain. Is the building located on a slope? Is the basement above flood level? Are there large trees near the building? Are such things as utility poles and flagpoles secure? Is the roof flat? Does water accumulate? Do gutters and drains work properly? Are they cleaned regularly? Are windows and skylights well sealed? Is there a history of leaks or other building and structural problems?

Within the building, fire protection systems, electrical systems, plumbing, and environmental systems are primary areas of concern. Are there enough fire extinguishers, and are they regularly inspected? Does the building have fire alarms and a fire suppression system? Are they well maintained? Are they monitored twenty-four hours a day? Are fire exits blocked? How old is the wiring? Is it overloaded? Are electrical appliances unplugged at night? Is auxiliary power available if needed? Are water pipes in good shape? Are there water detectors, and do they work? Are there any problems with the climate control system? You may have already thought of many other questions, and you should create a risk assessment checklist of your own.

It is also important to determine the vulnerability of the objects within the collections. What

types of materials are included? Are they easily damaged? Are they particularly susceptible to certain types of damage such as moisture, fire, breakage, and the like? How and where are collections stored? Are they protected by boxes or other enclosures? Is shelving anchored to structural elements of the building? Is it stable? Are any artifacts stored directly on the floor, where they could be damaged by leaks or flooding? All items should be raised at least four inches from the floor on waterproof shelves or pallets. Are materials stored under or near water sources? Analyze your security and housekeeping procedures. Do they expose collections to the dangers of theft, vandalism, or insect infestation?



Collection items stored directly on the floor or under climate-control equipment or air outlets are susceptible to damage from water, smoke, climate, and pollutants. Photo courtesy of Northeast Document Conservation Center, Andover, Massachusetts.

Consider administrative vulnerabilities. Are your institution's collections insured? Is there a complete and accurate inventory? Is a duplicate of it located at another site? Have collection priorities been set? In other words, do you know which collections should be salvaged first in the event of fire, water, or other emergency? Do you have a back-up priority list if you cannot reach the highest priority objects due to building damage or the nature of the disaster?

While these questions may seem overwhelming by the time you complete your survey, you will have a good idea of the significant risks your institution faces. Although there may be a wide range of disaster scenarios, events most commonly result in water, fire, physical, or chemical damage, or some combination of these. The specific procedures of a disaster plan focus on the prevention and mitigation of these types of damage.

Decreasing Risks

Once your institution's hazards are specified, the disaster planner should devise a program with concrete goals, identifiable resources, and a schedule of activities for eliminating as many risks as possible. Geography and climate cannot be changed, but other vulnerabilities can be reduced. If building and collections conditions are regularly monitored, repaired, and improved, many emergency situations will be forestalled.

A regular program of building inspection and maintenance should be a very high priority if one is not already in place. It can prevent or reduce common emergencies resulting from burst pipes, defective climate control equipment, worn electrical wiring, clogged drains, or other problems. If all improvements cannot be undertaken at once, make a schedule and follow it. If some items on your schedule prove impossible or are delayed, move on the next goal and return to the earlier problem when it becomes more practical.

Once building systems are in proper working order, devise a maintenance schedule. Patchwork repairs and deferred maintenance only result in accelerated deterioration, leading to an increased risk of emergencies. Keep a log of building events like clogged drains, furnace cleaning, and equipment failures. The more you know about your building and its operation, the faster (and more economically) repairs can be made.

While water damage is the most common form of disaster for museums, every institution with collections of enduring value needs a good fire-protection system. Since the bulk of emergencies

seem to happen outside normal working hours, reliable detection systems on professional, twenty-four hour monitors are a wise investment. Such systems should be designed and installed by professionals with experience in servicing museums and libraries, because the needs of institutions differ from the needs for home protection. Talk to colleagues and other local institutions or a conservator in your region for recommendations, and always check references.

A well-maintained roof is one of the best protections for the museum building and the artifacts it holds, but collections are very vulnerable during repairs and construction. Be sure your contract includes precautions against damage to your holdings, and that your emergency plan is completed before work begins. Photo courtesy of Northeast Document Conservation Center, Andover, Massachusetts.

Other actions that reduce building and collection vulnerability include maintaining a collection inventory, improving collection storage, and following good security and housekeeping procedures. An inventory will provide a basic list of holdings to assist in assigning priorities for salvage and will be essential for insurance purposes. Improved collection storage, such as boxing and raising materials above the floor level, will reduce or eliminate damage when emergencies occur. Comprehensive security and housekeeping procedures will ward off emergencies such as theft, vandalism, and insect infestation. They will also ensure that fire exits are kept clear and fire hazards eliminated.

A Cooperative Plan

Disaster planning should not happen in a vacuum. To work effectively, it must be integrated into the routine operating procedures of the institution. In fact, you will probably find that in planning for disasters you will also be working toward the accomplishment of other goals. For example, a properly functioning climate control system will prevent fluctuations in temperature and relative humidity, resulting in a better preservation environment and a longer life for all collections. At the same time, this prevents disasters such as water leaks from air-handling units. Similarly, if an institution surveys its collections and creates an inventory for purposes of disaster planning, a corollary benefit is better access to the collections for exhibits, researchers, and staff.

Remember three important characteristics of an effective disaster plan: comprehensiveness, simplicity, and flexibility. The plan needs to address all types of emergencies and disasters that your institution is likely to face. It should include plans for both immediate response and long-term salvage and recovery efforts. The plan should also acknowledge that normal services may be disrupted. How will you proceed if there is no electrical power, no water, and no telephone?

The plan must be easy to follow. People faced with a disaster often have trouble thinking clearly, so concise instructions and training are critical to the success of the plan. The key is to write in a clear, simple style without sacrificing comprehensiveness. Above all, remember that you cannot

anticipate every detail, so be sure that while your plan provides basic instructions it also allows for on-the-spot creativity.

Decide who will be responsible for various activities when responding to an emergency. Who will be the senior decision maker? Who will interact with fire officials, police, or civil defense authorities? Who will talk to the press? Who will serve as a back-up if any of your team members are unable to get to the site? Identify a location for a central command post (if necessary) and space for drying collections. Set up a system for relaying information to members of the salvage team. Because written information is susceptible to misunderstanding, your communications strategy might include notes to be delivered by "runners." Good communication is essential to avoid confusion and duplication of effort in an emergency.

Finally, if the planning process seems overwhelming, approach it in stages. Decide what type of disaster is most likely to occur in your institution, and begin to plan for it. The plan can always be expanded to include other scenarios.

Identifying Resources

Some important steps should be taken before you write your plan. First, identify sources of assistance in a disaster. Determine the supplies you will need for disaster response and salvage efforts for your specific collections. Basic supplies like polyethylene drop cloths, sponges, flashlights, and rubber gloves should be purchased and kept on hand. They should be kept in a clearly marked location, inventoried periodically, and, if necessary, replaced. If you choose to lock the cabinet containing the supplies, make sure the keys will be available in an emergency. A sample list of basic supplies is included with this article (See sidebar). Keep a list of additional supplies that might be needed. This list should include suppliers' names, addresses, and phone numbers, and should provide back-up sources for supplies. Arrangements should also be made for emergency cash or credit, because it is sometimes difficult to get money quickly in a disaster situation.

In recent years, many disaster-planning guides have published lists of supplies and companies that provide disaster services as well as sources of technical assistance. Research these services thoroughly—it is an essential part of the planning process. If possible, invite local service providers to visit your institution to become familiar with your site plan and collections in advance of an emergency. It is also a good idea to plan for back-up companies to provide critical supplies and services in case there is a community-wide or regional disaster. Consider coordinating with other local institutions. You may be able to make arrangements to borrow supplies, expertise, or labor in the case of a small-scale disaster.

Damage on the inside of a building often means problems on the outside. The plaster deterioration at the window is from water flowing down the planted hill. Drains left out of the original design had to be installed later at a higher cost than they would have meant during construction. Photo courtesy of Northeast Document Conservation Center, Andover, Massachusetts.

The disaster planner should identify all appropriate disaster response and recovery services. These can range from police, fire, and ambulance services to maintenance workers, insurance adjusters, and utility companies. Several national companies provide disaster recovery services such as dehumidification and vacuum freeze-drying. Liaisons should be maintained with local emergency services so that they can respond appropriately in case of disaster. For example, you may want to provide the fire department with a list of high-priority areas to be protected from water if fire-fighting efforts permit. You may be able to arrange with the fire department to allow specific staff members from your institution to enter the building for evaluation or salvage if safety allows. It may be possible to rope

Problems inside usually mean problems outside. This damaged ceiling requires evaluation of the roof to determine what repairs are necessary. Photo courtesy of Northeast Document Conservation Center, Andover, Massachusetts.

off areas for arson investigation while allowing accessibility to other areas. All such agreements must be organized in advance for efficient responses.

Other valuable sources of assistance are local, state, or federal government agencies. While it is widely known that the Federal Emergency Management Agency (FEMA) provides disaster assistance programs, institutions may not be aware that these programs can include art objects and cultural resources. An October 1991 FEMA policy change allows federal assistance to pay for conservation of art objects that are damaged in a disaster. Conservation is defined by FEMA as "the minimum steps which are both necessary and feasible to place the items back on display without restoring them to their pre-disaster condition." FEMA does not cover the replacement of destroyed items.

Setting Priorities

The first priority in any disaster is human safety. Saving collections is never worth endangering the lives of staff or patrons. In a major event, the fire department, civil defense, or other professionals may restrict access to the building until it can be fully evaluated. Once safety concerns are met, the next consideration will be to protect records and equipment crucial to the operation of the institution, such as registrar's records, inventories, and administrative files. Collections salvage and building rehabilitation will be the next priority.

Objects or collections of great importance to the institution must be identified ahead of time. If this is not done, valuable time may be wasted salvaging materials of little value or spent arguing about what should be saved first. Ideally, this step includes a floor plan that clearly states the priority of collections for salvage. This should be attached to the disaster plan, but the security of this type of information should be considered. It may be wise to allow only upper level staff access to this part of the plan prior to an actual emergency.

Salvage priorities should be based not only on the value of objects, but on their vulnerability to the particular damage caused by the emergency. If you are not knowledgeable about the hazards for various materials, contact a conservator to help you incorporate these considerations in your salvage plan. Paper and textiles, for instance, are susceptible to mold when they are warm and damp. Many metals will corrode rapidly under the same conditions. Salt water may accelerate corrosion. Ivory, small wooden objects, and lacquer may swell and crack with rapid changes in moisture and temperature. Veneers and furniture may be constructed with water-soluble adhesives. Objects may become very brittle after exposure to the temperatures of a fire. All categories of collections have special handling and salvage procedures developed by experienced professionals. Because the instructions for salvage of the wide variety of objects found in museum collections is beyond the scope of this article, a brief

reading list has been included for further information.

Writing The Plan

Once the necessary preliminary steps have been undertaken, writing the plan should be relatively straightforward. Although each plan will be different, a sample outline is given below:

1. Introduction—stating the lines of authority and the possible events covered by the plan.

2. Actions to be taken if advance warning is available.

3. First-response procedures, including who should be contacted first in each type of emergency, what immediate steps should be taken, and how staff or teams will be notified.

4. Emergency procedures with sections devoted to each emergency event covered by the plan. This will include what is to be done during the event, and the appropriate salvage procedures to be followed once the first excitement is over. Include floor plans.

5. Rehabilitation plans for getting the institution back to normal.

6. Appendices, which may include evacuation/floor plans; listing of emergency services; listing of emergency response team members and responsibilities; telephone tree; location of keys; fire/intrusion alarm procedures; listing of collection priorities; arrangements for relocation of the collections; listing of in-house supplies; listing of outside suppliers and services; insurance information; listing of volunteers; prevention checklist; record-keeping forms for objects moved in salvage efforts; salvage procedures.

Maintaining The Plan

No matter how much effort you have put into creating the perfect disaster plan, it will be largely ineffective if your staff is not aware of it, if it is outdated, or if you cannot find it during a disaster. A concentrated effort must be made to educate and train staff in emergency procedures. Each staff member should be made aware of his or her responsibilities, and regular drills should

Basic Emergency Supplies and Equipment

The following is a sample list of basic supplies that should be kept on hand in the event of an emergency:

- Dehumidifier
- Metal Cart
- Plastic (milk) crates
- Flashlight
- Fifty-foot extension cord (grounded)
- Portable electric fan
- Wet vacuum
- Blank newsprint
- Freezer or wax paper
- Plastic trash bags
- Plastic buckets and trash can
- Paper towels
- Sponges
- Mop
- Monofilament nylon (fishing) line
- Broom
- Gloves (rubber/leather)
- First aid kit
- Clipboards
- Emergency funds (cash and purchase orders)

be conducted if possible. Keep several copies of the plan in various locations, including a location that is off the site (ideally in waterproof containers). Each copy of the plan should indicate where other copies may be found.

Most importantly, the disaster plan must be updated periodically. Names, addresses, phone numbers, and personnel change constantly. New collections are acquired, building changes are made, and new equipment is installed. If a plan is not kept completely up to date, it may not be able to assist you effectively in dealing with disasters.

Disaster planning is essential for any institution to provide the best possible protection for its collections. Disaster can strike at any time—on a small or a large scale—but if an institution is prepared, the damage may be decreased or avoided. A disaster plan must be considered a living document. Its risk-assessment checklist must be periodically reviewed, its lists must be updated, and its collection priorities revised as needed. An effective disaster plan will ensure that historical collections in our cultural institutions are safeguarded for the benefit of those who come after us. ■

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Suggested Reading

The following sources provide further basic information on disaster planning for museums.

Hunter, John E. "Museum Disaster Preparedness Planning." In *Protecting Historic Architecture and Museum Collections from Natural Disasters*, edited by Barclay Jones. (Boston: Butterworths, 1986), 211–230.

Museum News, May/June 1990.
(Special focus issue on emergency preparedness for museums.)

Recommended Practice for the Protection of Museums and Museum Collections, No. 911. Quincy, Massachusetts: National Fire Protection Association, 1991.

O'Connell, Millie. "Disaster Planning: Writing & Implementing Plans for Collections-Holding Institutions." *Technology and Conservation* Summer 1983, 18–26.

Walsh, Betty. "Salvage Operations for Water Damaged Collections." *Western Association for Art Conservation Newsletter*, vol. 10, no. 2, May 1988.

Wilson, J. Andrew. "Fire Fighters." *Museum News*, November/December 1989, 68–72.

HISTORY NEWS TECHNICAL LEAFLET

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Collections Care: What to Do When You Can't Afford To Do Anything

BY LISA MIBACH

We're in hard times for museums. Although collections preservation is increasingly being seen as a national priority, and Federal funding programs which support collections care have increased, local funding has diminished drastically for many institutions, often with serious consequences both for museum staff and for collections care.

Hard times can mean hard choices. Perhaps the hardest choice facing museums now is finding ways to put money and staff energy into exhibits and public programs to keep attendance up, while still finding the time and money to take care of the collections which are the reason for the museum's existence.

When time is scarce, we have to find ways to use it to provide the greatest good for the collections as a whole. Improving collections care requires planning, inventiveness, commitment, and considerable effort; it is easy to fall prey to "displacement activities", and find ourselves shining the silver, or taking home the christening dress to bleach and starch, because these activities give us a feeling of having accomplished something quickly.

NEW LAMPS FOR OLD

It is true that some interpretive uses may require an "as-new" appearance: for example, a weapon in active military use was kept shiny because it was military practice to keep troops busy with cleaning and polishing (as well as keeping the weapons in reliable working order). However, most historic objects are valuable because of their age, and don't need to look new. In most cases, the "condition of last use" or the appearance of "old but cared for" is more appropriate. Artifacts are actually non-written historical documents, and the specific history of the piece and the technological information contained in it can be destroyed by overzealous cleaning. In addition, most objects are not as strong as they once were, and cleaning methods appropriate for new things may cause deterioration: textiles fibers have been weakened by light and washing, and intergranular corrosion in metals may cause the object to crack if strong cleaners are used.

SO WHERE DO WE BEGIN?

As in medicine, the first goal should be to "do no harm": to prevent damage rather than trying to correct it, and to stabilize physical condition rather than to improve cosmetic appearance.

Some of what we do to prevent damage to collections does require money, for example for acid-free storage materials; but in most cases one can begin with materials obtained by contribution (that tax receipt is a powerful tool!), upgrading them as funds become available. Preferred materials will be discussed below, even though they may require supplementary funding, because knowing where you are going is an important part of starting.

The first step is to realize how many resources we do have, even if staff are in short supply. Most collections care projects can be broken down into smaller units which can be accomplished by groups of colleagues or by volunteers, although an overall Plan is necessary in order to develop smaller projects which will fit together in a meaningful way. Heritage institutions know, better than most, how people have coped in hard times past, and we can adapt those techniques to our needs today. For example, although the number of volunteers available to do storage upgrade projects has diminished, "barn-raising" provides a model for "storage parties", in which staff from neighboring museums can help each other on a day when the museums are closed, to vacuum, dust, and re-house artifacts. This puts an encouraging dent in an otherwise overwhelming project, while pooling ideas and supplies, and maybe even having fun.

Supplies, too, can be had inexpensively: of course acid-free, archival quality boxes are best for storage, but if these cannot be acquired immediately, artifacts can be temporarily stored on paper-covered shelves under fitted dustcovers pieced together from old sheets; other objects can be placed carefully in labeled cardboard boxes, lined first with heavy polyethylene sheeting or aluminum foil, and then with well-washed white cotton bath towels or sheets donated by a local hotel. This is preferable to having things on the floor in an inaccessible heap, vulnerable to floods and insects.

Information comes least expensively of all: the appended bibliography provides the specific information you will need for the care of different types of materials, for preparing plans for emergency preparedness and for long range preventive upgrading, for regular collections maintenance, and for grant applications.

Many of these books and articles are available on loan from local heritage associations. Those useful for frequent reference might be funded by a grant or by an astute donor. Heritage associations also provide workshops, which may include specialty advice from a conservator or environmental engineer, or may focus on sharing successful ideas within the professional community. Either way, the networks of resources built at these workshops are an important addition to the technical information provided.

The Campbell Center, in Mt. Carroll, Illinois, provides an excellent course in the general care of collections, as well as courses focusing on the needs of special materials such as photographs. Write for a catalogue to: Mary Wood Lee, Director, Sawyer House, Campbell Center, Mt. Carroll, IL 61503 (815-244-1173).

It is most helpful to have the advice of a specialist who can point out problem areas and help to determine priorities to fit your situation. The Conservation Assessment Program, funded by the Institute of Museum and Library Services, of the National Institute for Conservation (3299 K St NW, Suite 403, Washington DC 20007; 202-625-1495) provides grants on a first come, first serve basis, which pay the fees for an on-site visit and report by a conservator, and by a preservation architect for historic buildings.

The American Institute for Conservation of Historic and Artistic Works (AIC), Suite 340, 1400 16th St NW, Washington, DC 20036, (202-232-6636) can provide a list of members (which includes interested Associates as well as Professional Associates and Fellows) by specialty and by geographical region. Specify the largest region possible (or none) as some specialties may be scarce outside the coastal areas.

WHAT YOU CAN DO ON YOUR OWN

The Building Structure

You can start with a careful inspection of the physical structure of your building, taking account of past problems (leaks, flooding basements). Important elements are the roof, gutters and downspouts (where do they drain? directly into the foundation?), cracks in the walls, moisture penetration from deteriorated mortar or

sandblasting, and the drainage on the site.

Eventually you may need a the services of a structural engineer (one experienced with historic buildings, if your institution is in one) to advise on repair priorities and costs, but you can begin to assemble information and record changes that will justify the expenditure for professional help, and make the engineer's inspection quicker. If you do not have a written building maintenance plan, this is the time to develop one.

Controlling the Environment

Mechanical systems to heat, ventilate, and cool the environment are desirable, if they are designed, to maintain a constant relative humidity, rather than only for human comfort, as in office systems. When museum standards are not taken into design consideration, office or residential systems may actually cause damage. A system compatible with collection needs may not cost much more; for this reason it is advisable to seek initial design advice from an engineer with experience in environmental controls in museums and historic houses.

Microclimates

When it is not possible to control the environment in an entire building to museum standards, humidity-sensitive objects (for example, those made of organic materials) can be kept in enclosed spaces such as display cases or storage cabinets or boxes, where environmental changes can be controlled more easily. It is advisable to seek the advice of a conservator experienced in environmental issues to decide how best to adapt this concept for your institution.

Humidity-Buffering Materials

Although extreme levels of relative humidity beyond recommended norms will permanently affect artifacts, by far the greatest damage is caused by sudden changes of more than 10 % within a few hours. If external changes can be slowed down before they reach the collections, damage will be minimized.

This can be achieved by enclosing or wrapping artifacts with humidity-buffering materials: silica gel is perhaps the best-known example, but natural organic materials such as paper, cloth, and cardboard, also absorb excess humidity and release it slowly, slowing the environmental changes around the artifact. (If we are not to replace one type of damage with another, it is essential that these materials be free of acids and other undesirable volatile materials either inherent or added during manufacture. For this reason, wood is not recommended as a buffering material.)

Examples of recommended humidity-buffering materials include acid-free tissue (preferably "non-buffered", which in this case means without the addition of alkaline substances to counteract acidity), washed linen or unbleached cotton muslin, washed old white sheets and towels, acid-free folder stock, acid-free mat board, and acid-free corrugated cardboard.

"Box Within A Box" I

In designing a passive humidity-buffering microclimate (one which controls changes in relative humidity by means of its innate physical properties, rather than through the use of mechanical HVAC control systems), it is helpful to use the concept of "a box within a box". In this concept, one thinks of the building structure as the first "box", or protective enclosure, the storage room or gallery as the second "box" a display case or storage cabinet or dust-cover enclosed storage rack as the third, a storage box or container as the fourth, and humidity-buffering wrappings or case lining materials as the fifth. Each of these "boxes" is a line of defense against damaging environmental fluctuations.

When it is not possible to control the environment in an entire building to museum standards, humidity-sensitive objects can be kept in enclosed spaces such as display cases or storage cabinets or boxes, where environmental changes can be controlled more easily.

Monitoring

A recording hygrothermograph is useful (and expensive, but grant-fundable) because it automatically records the amount and timing of the fluctuations in relative humidity which are of concern; the shape of the curves produced on the machine's chart can also be diagnostic to an HVAC engineer in determining the adequacy and condition of your equipment. Two sources are: Art Preservation Services, 253 East 78th Street, New York, NY 10021 (212-794-9234) or the four-speed unit #08368-60 from Cole Parmer (1-800-323-4340).

Each time a chart is changed, the machine should be checked for calibration with a battery operated psychrometer (equivalent to the Cole Parmer model N-03312-20); the correct time, RH, and reasons for any unusual events (for example: "thunderstorm" or "school tour" or "rental wedding") should be noted on the chart.

The battery-operated psychrometer should also be used to make spot checks of individual areas (preferably noted on a photocopied floor-plan) in the same spot in the early morning, and again late in the afternoon, to determine the effect heat gain has on relative humidity, and to acquaint staff with areas of environmental extremes to avoid in designing exhibits. Anomalies may also indicate problems with the building structure which should be further investigated by a structural engineer.

Storage

Good storage is secure, clean, dry, and insect-free, with a stable environment, and no internal pollutants.

The chemical stability of all the materials used around collection materials is of critical importance to the preservation of those objects. Although some inexpensive substitutes for specially manufactured archival materials can be used (for example, old washed white bath towels instead of silica gel as a humidity-buffering material), it is generally preferable to seek grant funding so that the work involved in a re-housing project need be done only once.

Until archival quality materials can be obtained, one may begin with careful use of inexpensive materials, with a barrier layer (Mylar Type D, or aluminum foil with a cotton cover, or Marvel-Seal #1311) between the objects and the acidic material, and then upgrade later on. However, in high relative humidities, acidic materials can be released as gaseous pollutants (noticeable from their odor) into the air surrounding the objects, so this situation should not be allowed to continue over the long term.

Examples of safe materials for storage:

- polyethylene (for example clear sheeting, some slide storage pages, or Dow Ethafoam—check with the manufacturer to get a product that has minimal manufacturing additives, such as "slip agents"; dry-cleaners' bags are not recommended)
- polypropylene (for example Microfoam, or some slide storage pages)
- polystyrene (for example, clear storage boxes)
- polyester (for example as fiberfill, or Dupont virgin Mylar Type D sheet)

Examples of materials which should not be used:

- cardboard which is not manufactured to archival standards
- tissue paper which is not manufactured to archival standards
- felt or colored fabrics which have dyes or chemicals introduced during manufacture
- poly(vinyl chloride) (VINYL) whether as sheet material, photo enclosures, or solid pipe
- plywood, masonite, or fiberboard (some storage units may be retrofitted by sealing the exposed surfaces with a metal-polyethylene film material such as Marvel-Seal 1311)

Structural plywood panels trademarked by the American Plywood Association (APA) are reported to be made with phenol resin, not urea resin, which means that they will outgas little formaldehyde. However, the acidic gases from the wood itself must still be sealed with a barrier sheet; no liquid sealants are known as this time which have been proven in practice to be both effective and inexpensive.

As reported by Miles in *Wood Coatings for Display and Storage Cases* (see bibliography), neither shellac nor polyurethane is an effective barrier coating for wood or wood by-product materials used around collections materials, while oil-modified coatings (alkyd paints) actually cause corrosion. Two component epoxy and some moisture-cure urethanes show promise, but tend to be expensive.

Hence the recommendation for the use of Marvel-Seal, since this is used in the construction industry as a vapor barrier, and it may be possible to obtain remnants from building projects.

The selection of storage furniture is complex, involving the evaluation of risk variables and the assistance of a conservator is recommended. For closed cabinets, avoid "baked enamel" coatings, as these are usually alkyd paints which can cause corrosion and possible textile fiber damage; select "powder coatings" instead. Open shelving should be of industrial strength; old units will probably have fewer volatiles than new shelving, so the solicitation of donated shelving from downsizing industries is recommended.

STORAGE QUESTIONS YOU'VE RAISED ACID FREE BOXES

Q. *Should I use buffered boxes or not?*
A. Buffered paper materials have an alkaline substance added (usually calcium carbonate) to neutralize any residual acid from manufacturing, and to keep them from absorbing acid from the environment around them.

Concern has been raised that alkaline residues could possibly react with materials made from proteins (wool, hair, leather, some kinds of historic photographs). This a legitimate concern, but unfortunately the only boxes which are both acid-free and non-buffered also tend to be extremely expensive, and will probably be used only for extremely important artifacts. (Available from Conservation Resources, 1-800-634-6932.) The most reasonable solution seems to be to use the best quality box you can afford, and to store protein-based materials separately in acid-neutral materials; professional advice is recommended.

Please remember that acid-free tissue is not a barrier to acid migration: this requires Mylar D or Marvel-Seal.

Q. *How can I tell if the boxes have an alkaline buffer?*
A. Sometimes only with difficulty; look for the designation "pH 8.5" which indicates that alkaline material has been added; most suppliers of archival materials include a description of their manufacturing specifications somewhere in the catalogue, which you can find if you are persistent.

Q. *What is the shelf life of acid-free boxes and tissue?*
A. This depends on the quality of the air around them. If the boxes are sealed in a powder-coated storage cabinet, in a room free of wood products, in an area with pollution-free air, you can expect years of life; on the other hand, a roll of acid-free tissue stored on a plywood shelf next to acidic cardboard boxes in a polluted urban environment may absorb acidic gases into the outer layers within a year.

Q. *To bag or not to bag?*
A. It depends what you are protecting your collection

from. If you are downwind from an iron foundry, or if you have recurring insect infestations, these may be considered greater hazards than contamination by plasticizers and manufacturing additives (see Williams, *Stable Materials for Use in Storage*), and the possibility of condensation during power failures.

If you can use archival quality polyethylene or polypropylene, you will reduce the hazard, and if you wrap the object first in acid-free tissue, you will avoid the danger of water staining from condensation, even though you lose visibility.

Q. *But plastic is plastic, right?*
A. Wrong. Many plastic materials may be manufactured with additives to facilitate handling (slip agents and anti-stats) or to extend shelf life. For example, some dry cleaners' bags were observed to turn white fabric yellow: this turned out to be due to BHT added to the polyethylene. It is preferable to choose archival quality from specialized suppliers, and leave the Baggies for lunches.

A Little Support

When deciding on how to store or display an object, it is important to consider the "natural position of rest" of the object, in order to determine whether it needs some form of support or padding.

The "box" concept helped us to decide on how many enclosures are needed to protect the object from the environment, by conceptualizing from large to small. In order to design supports, we must reverse the process and think from the object out:

Does the object need padding to prevent abrasion or vibration?

Does it need a support to prevent sagging or to hold it in place?

Is a box or case needed for support or microclimate enclosure?

How big does the container need to be to contain the object and padding/support, without crowding or folding?

How will this container best fit in the cabinet or on the shelf to provide easy access?

Shedding Some Light...

By now everyone should be able to chant in unison, "5-10-15 foot candles", so this topic will be left to the specialized discussions in the literature, except to note that one can see quite well at low levels, providing that the visitor has been led gradually from bright outside areas and windows to lower light levels, and that even, wall-washer illumination is used rather than bright spots and dark shadows. See the full discussion in Thomson, *The Museum Environment*, a copy of which should be in every museum. The lux or footcandle light meter is a useful museum tool, as it is difficult to evaluate light levels by eye; inexpensive models may be obtained from Edmund Scientific Company (Lutron LX-101 Lux Meter), 101 E. Gloucester Pike, Barrington NJ 08007-1380 (609-547-8880); or from ExTech Instruments Corp (model AC 401025 Foot Candle/Lux Meter), 335 Bear Hill Road, Waltham MA 02154 (617-890-7440).

Handling

A good resource, such as *The Care and Handling of Art Objects* by Marjorie Shelley, should be read by each person handling collections, since careless handling is the second greatest cause of damage to museum collections.

Receiving and workshop areas should be kept clear of obstructions, with clean padded tables for receipt and inspection of incoming material.

Mobile racks or shelving can be used in temporary storage areas to maximize use of space, prevent accidents, and help organize workflow. The wheeled chromed-wire racks used for restaurant food storage are excellent for this if the shelves are padded with a layer of microfoam. Zipped nylon dust covers are available, which provide a neat appearance, and protect from dust and curious fingers.

Cafeteria tray carts are more compact and useful for moving smaller items, and are acceptable as long as objects are not left on the plastic trays longer than a few days. Baker's carts with aluminum trays (to be padded with microfoam) offer slightly larger dimensions and materials which are chemically more stable. Many of these items can be donated or acquired from restaurants going out of business.

Good storage is secure, clean, dry, and insect-free, with a stable environment, and no internal pollutants. The chemical stability of all the materials used around collection materials is of critical importance to the preservation of those objects.

Pests

Many museums have a history of problems with insects, moulds, and errant rodents and birds. Some have a regular pest control contract, but this is usually not a significant substitute for an integrated program of pest prevention.

In many places, staff prepare food and eat on the premises: this is a high-risk hazard,which can be minimized if all open food is kept in the refrigerator, and the preparation area is swept daily. It is also advisable to restrict the consumption of hospitality food to a reception space outside the galleries and away from storage areas.

Recommendations

Assign food preparation area cleanup to individual staff members on a rotating basis to ensure that no food residues remain which could be attractive to insects.

Implement an integrated pest prevention program:

- Install "sticky traps" and monitor for insect specimens, especially in storage, as many insects avoid the light and are not visible unless deliberately sought.
- When collection areas are swept, debris should be collected and examined in strong light under magnification for evidence of insect activity such as cast skins, eggs, and larvae.
- Insect occurrences should be logged in a central place to learn what patterns of infestation may exist, and for treatment reference if necessary.
- A copy of *A Guide to Museum Pest Control* should be available for reference (see bibliography for ordering information).
- It is helpful to have an entomologist set up a reference box of museum pests (see *A Guide to Museum Pest Control*) and common non-pest insects to facilitate identification of logged specimens.
- Inspect roof areas for birds and bats, whose droppings harbor infestations, as well as being health hazards. A product called "Bird Tanglefoot" has been used to good effect in getting rid of nesting pigeons.
- The list of pesticides in *A Guide to Museum Pest Control* should be used to check any sprays or powders proposed by pest control contractors. Baseboard sprays usually have an oily base which should not be allowed to come into contact with museum objects.
- Incoming collection materials should be inspected and vacuumed to remove insect eggs in an isolated holding or preparation area before being placed in storage.

Collections Maintenance

Dusting and custodial care are as important for collections in museums as they are for homes, although certain familiar materials and techniques may not be recommended for museum use. In general, oily "dust collectors" and sprayed polishes should not be used: clean lambswool dusters are preferred. All furnishings and boxes should be moved at least once a year to remove dust (all around, all surfaces), and to remove possible havens for insects.

A written maintenance schedule should be developed and should be rigorously followed. *The Manual of Housekeeping* by the National Trust of England discusses all aspects of maintenance for most historic materials, and is very highly recommended (especially since we do not have an American equivalent), even though the English tone may take some interpretation. A video version is also available.

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Cleaning of Specific Materials

This is a lengthy topic, and cannot be covered adequately in this Technical Leaflet. The bibliography lists excellent books and handouts for most materials. Groups of museums may also wish to consider joining together to conduct regional (and grant-fundable) workshops by conservators to teach specific techniques such as textile washing and repair, furniture maintenance, and metal cleaning and polishing.

Recognizing Problems

The NY State Conservation Consultancy series, now issued by the Smithsonian Press as the book *Conservation Concerns* edited by Konstanze Bachmann, lists recommended storage techniques for various categories of materials, along with descriptions of how to recognize problems, and when to call a professional. All museums should have a copy. *Caring for Your Collections*, by the National Committee to Save America's Cultural Collections, is also a useful resource.

PLANNING: EMERGENCY PREPAREDNESS

Safety

The Center for Safety in the Arts (212-227-6220) has an excellent series of inexpensive publications and training videotapes relevant to museum activities. Appropriate information sheets should be purchased and kept available to staff. Also see AASLH Technical Leaflet #183, "Disaster Planning for Cultural Institutions."

Emergency Preparedness Plans

These should be updated annually, and should contain the following:

- written schedules for maintenance of emergency systems and fire extinguishers, and for regular drills and tests of alarms;
- lists of staff responsibilities in emergencies;
- lists of supplies for recovery of the collections after fire or other disaster, the location of off-site recovery caches of these supplies;
- priority lists and locations for the most valuable collection items. (This list may be kept as a separate section with restricted distribution.)

Local emergency preparedness coordinators (fire,

city, county, state) should have copies of the plan, should be consulted during its development, and should be informed of the special nature of the building and its contents.

An excellent museum plan which can be used as a model is available from:

Robert Herskovitz
Head, Conservation
Minnesota Historical Society
345 Kellogg Blvd. West
St. Paul, MN 55102-1906

A template emergency plan, with lists of supplies, is available on paper and on MS DOS computer disk for about $100 from Maines and Associates, 237 Langmuir Lab, Cornell Research Park, Ithaca, NY 14850 (607) 257-1969. This will give you a workable plan quickly; it can then be refined during the annual review.

Long-Range Conservation Plan

Evaluate your collections carefully before taking conservation action. Survey the physical aspects of your museum to determine their impact on your collections. Identify projects for improvements in storage and display, and know which items in your collection are both significant and in need of conservation treatment. Thoughtfully prepare a prioritized long range conservation plan to guide your actions. Become familiar with proper techniques, tools, and materials which will help you to carry out the plan.

Finally, remember to update your Plan at least annually, and keep a list of the projects you have accomplished (with photographs!), so that on those dark days when it seems that you just can't do anything, you can look back and see how much you have in fact achieved.

NOTES

[1] Dennis Piechota, of Object and Textile Conservation, 16 Central Street, Arlington MA 02174, first articulated this concept.

[2] This article was first suggested and published as Technical Insert #54 in 1991 by the Illinois Heritage Association; it was expanded and included in the Interiors Conference for Historic Buildings II (1993) at the request of the National Park Service.

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HISTORY NEWS TECHNICAL LEAFLET

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Protecting Cultural Heritage Properties From Fire

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Few people would argue that disaster preparedness does not need to be included in any long-range historic property preservation plan. Where arguments may arise, however, is what constitutes a threat to any given property or its contents? If everyone responsible for heritage properties were to list the hazards confronting their properties, the lists would no doubt vary greatly from state to state, county to county, town to town, and building to building. The lists would encompass a wide range of hazards and risks—flood, earthquake, tornado, hurricane, theft, insects, mold, fire, vandalism, air pollution, etc. If one master list was created and circulated to everyone, *(continued)*

with instructions to strike out all those hazards that do *not* apply specifically to you, the list would probably come down to a single common threat—FIRE. *Fire* is the single greatest threat *all* cultural heritage properties face; none are immune from it. Until the owners/trustees of these properties develop plans for dealing with the fire threat, they place the building and its occupants, visitors, and furnishings at risk. The complexity of these plans may vary from a simple evacuation plan, to a fire prevention program, to a more complex plan, which includes passive and automatic fire protection systems.

Property damaged by floods can often be dried out and restored. Structural damage from an earthquake might be repaired. Stolen property always has a chance of being recovered. Damage from fire, however, is usually permanent and irreparable. Historical buildings or contents, once reduced to ash, can *never* be restored. Fire is more cunning and less discriminating than a thief is. It can travel (spread) through very small openings and concealed spaces to reach other parts of a building, deprive occupants of a life supporting environment, and cause partial to total destruction of property.

There exists a cavalier attitude in this country that "fire won't happen to me," that, "it is someone else's problem." Americans also place a lot of blind faith in their local fire department to save them and their property from any fire that may occur, and believe insurance will cover the rest. Reality is very different, and our daily fire statistics bear this out. About 2 million fires are reported each year in the U.S.[1] There has been an annual average of: 102 fires in museums; 212 fires in libraries; and 1450 fires in places of worship.[2] Unfortunately, statistics are not kept for fires in historic buildings. It would probably be safe to estimate the annual number of fires in historic buildings to be well in excess of all those above combined, i.e. >1765.

At the very least, every property, including private residences, should have an emergency self-protection plan that spells out how to report a fire and safely evacuate the premises.

FIRE PREVENTION

Cultural institutions are just as susceptible, if not more so, to the wide variety of common ignition sources that are responsible for most fires elsewhere. The most important factor in preventing a fire loss is through the maintenance of a good fire prevention program. The fire protection program (policy) needs to be in writing and updated periodically. Management and staff responsibilities need to be defined, and fire prevention procedures established. This program must be based on a high standard of housekeeping, orderliness, maintenance of equipment, continuous staff training and awareness in both recognizing and eliminating fire hazards (ignition and fuel sources).

At the very least, every property, including private residences, should have an emergency self-protection plan that spells out how to report a fire and safely evacuate the premises.

Safeguarding Ignition Sources

Some of the leading causes of fires in historic properties are: heating devices, such as space heaters and heating and cooking stoves; arson and suspected arson; electrical wiring and appliances; smoking; and air conditioning. Through care and diligence, many of these ignition sources can be guarded against; however, the risk of fire will always remain a distinct possibility.

Much can be done to minimize the chance of a fire starting or spreading with little or no expenditure of monies. Your elementary school training taught you that it takes fuel, air, and heat (an ignition source) for fire to occur. You cannot do much about air, but you can control both the fuel and the ignition sources in your facilities.

[1] U.S. Fire Administration data for CY 1997
[2] National Fire Protection Association (NFPA) Standard 909 – Protection of Cultural Resources, 1997 edition.

To reduce the likelihood of fire, start by controlling potential ignition sources:

• Smoking should be prohibited throughout all cultural institutions—No exceptions! Large noncombustible ashtrays, preferably filled with sand, should be provided on the exterior of the building, to preclude staff and visitors from tossing their live cigarettes into the surrounding dry mulch or vegetation.

• Welding, cutting, or burning perhaps represents the number one cause of fires in cultural heritage properties, as so many fires occur to buildings under renovation or repair. A daily "hot work" permit system should be established and strictly enforced. This system should require a contractor or other person wanting to perform hot work, to have a signed permit from a responsible staff person after it has been determined/agreed upon that:

- ✓ all combustible materials are protected [This can be accomplished by covering all combustibles with fire retardant blankets, or constantly wetting the area down],
- ✓ a fire watch is established [this involves having a designated person or persons standing by with a portable fire extinguisher for the duration of the work, plus half an hour beyond, to extinguish any blazes that may start], and
- ✓ the area is carefully inspected afterwards to detect any fire or smoke.

To this end, incorporation of an early warning fire detection system, should be part of any fire protection program.

• Fuel fired portable heaters should be prohibited. Portable electric heaters also should not be permitted because of their high potential as an ignition source, possible electrical circuit overloads, and high operating costs.

• Electrical appliances such as hot plates, toasters, coffee makers, etc., should be restricted and allowed only with written management approval. The authorizing official should ensure the appliance: is listed or approved by a recognized testing laboratory (these products must pass tests to help assure they are fire safe); has a visual light to indicate when the appliance is "on"; is installed on a non-combustible surface and separated from other combustibles by at least 18 inches. Appliances and electrical cords should be routinely inspected for obvious problems (burn spots, frayed wires, etc.), and immediately repaired or disposed of when problems are found. It is also a good practice to look for and purchase appliances that incorporate an automatic shut-off after so many minutes/hours of non-use, and to unplug electrical appliances when they are not in use.

• Heating, air conditioning, and other mechanical equipment and major appliances should be installed by professionals in compliance with codes. This equipment should also be maintained, inspected, and tested in accordance with recognized safe practices.

• Electrical wiring should be installed in strict accordance with code and only by qualified electricians. Extension cords and multiple plug adapters should be avoided. If a circuit keeps tripping off or a fuse keeps blowing, it is overloaded with too many electrical appliances. Never try to remedy the problem with a higher rated fuse, penny under the fuse, or taping open the circuit breakers. Either reduce the electrical load or have additional circuits added.

• Consider installing arc-fault circuit interrupters on your electrical circuits. This is a relatively new (1998) product that will shunt power to a circuit upon detection of any arcing in the wires—a usual occurrence prior to an electrical fire. This product is not to be confused with ground fault circuit interrupters, which help prevent electrocution.

• Lightning protection should be checked by an expert to ensure that it is adequate, in good repair, and properly grounded.

These are just some of the more common ignition sources one can and should guard against. One must also strive to separate combustible materials from potential ignition sources and minimize the amount and continuity of combustible materials in any one area.

Safeguarding Fuel Sources

• Safe containers (metal cans with tight fitting metal lids) should be used for collecting waste papers, oily

rags, and other refuse, and for storing packing material. Waste materials should be removed from the building on a regular basis (daily as a minimum).

• Store important papers or collections in fire resistive safes or storage cabinets. Even good, well-constructed cabinets that are not labeled "fire resistive" will help protect their contents to some degree from fire, water, and other possible types of damage.

• Flammable liquids should be stored in and dispensed from approved safety cans only. These containers have a spring-loaded cap and a wire mesh screen (flame arrestor) inside the can. In addition, the quantities of these materials permitted in the building should be held to an absolute minimum, and stored in approved flammable liquid storage rooms or within flammable liquid storage cabinets.

• Hallways, stairways, and access aisles must be kept clear of all storage; DO NOT USE THESE AREAS FOR STORAGE, EVEN TEMPORARILY! Housekeeping and storage in all other areas should be neat and orderly.

• Do not store or place materials against electrical outlets, light fixtures, or heat producing equipment.

• Storage should be prohibited in mechanical equipment rooms, electrical closets, telephone closets, and within 3 feet of the front of electrical circuit boxes and panels.

• Interior finishes (carpeting, ceiling tiles, acoustical wall coverings, etc.) that can be ignited with a match should never be used. Ask manufacturers or distributors to provide fire retardant products, with certification of flame resistance.

• Exhibits, as well as any interior/exterior modifications, should be constructed of fire safe materials to reduce the fire risk. Always ask your designer, fabricators, or supplier if they can offer the material you want in a fire retardant variety. These materials may be a little more expensive but can substantially reduce the risks to your collections and building.

• Consider the use of a fire retardant chemical or paint to treat combustible materials as a means to reduce the chance of ignition.

• Holiday decorations should only be the fire retardant type, and well separated from lights and other potential ignition sources.

While an outstanding fire prevention program will effectively preclude most fires from starting, the risk of a fire remains. Since fires can develop at alarming speeds (from flame to flashover in a matter of minutes), immediate knowledge of a fire condition is essential to both serve as a warning for life safety, as well as summon assistance to fight the fire. To this end, incorporation of an early warning fire detection system, should be part of any fire protection program.

Two critical components for ensuring that a fire detection system functions properly are periodic testing and maintenance.

FIRE DETECTION SYSTEMS

Fires produce a variety of products and byproducts, including smoke, heat, light, sound, and various gases. There are a variety of fire detectors available today that can sense each of these products, and usually one can mix and match detectors on a common fire detection system. For most historic properties, however, smoke detectors usually offer the best means for detecting a fire at its very earliest stages.

The most common types of smoke detectors available and used in buildings today are spot-type photoelectric or ionization detectors. Without going into detail as to their principles of operation, photoelectric detectors react more quickly to smoldering fires that produce visible smoke, whereas ionization detectors react more quickly to invisible products of combustion and flaming fires. The type of detector(s) selected for use may vary from room to room depending upon the construction, furnishings, and operations encountered. A fire protection specialist should be consulted for advice. A single spot-type smoke detector can generally protect a room up to 900 square feet. If a room is larger than that, or you want more optimal detection, consider using a mix of photoelectric and ionization detectors in the space.

Smoke detection systems have become rather sophisticated with the advances in computer technology. Today's systems can often list/adjust the sensitivity setting of the detector, adjust for dirty conditions, provide an exact address of the detector [e.g. "Green Room—Second Floor"], and perform specific actions upon activation [e.g. close doors, shut down power, etc.], among other things. Wireless systems are also available, which can be a benefit in historic structures where running wiring may be difficult.

Perhaps the most sensitive smoke detection systems available are the air sampling systems that continually draw and examine the air from a room or rooms. These types of smoke detection are very expensive, and do not readily lend themselves to protecting an entire building. They do, however, offer an aesthetic advantage, in that no visible devices need be installed in the area(s) being protected. Instead, very small diameter tubing can be discreetly inserted into the room, with nothing visible showing.

An automatic sprinkler system is the single most important fire-safety system a cultural property can have.

Prior to installing a fire detection system, a decision has to be made as to what is its purpose. If the fire detection system is strictly for life safety (the building can burn down as long as everyone gets out in time), then the system need only to sound an alarm in the protected premises. If, however, the intent of the system is to not only sound a local alarm, but also summon trained personnel to fight the fire, then the system must be monitored around the clock. This should preferably be done at the local fire department or a certified control station.

Two critical components for ensuring that a fire detection system functions properly are periodic testing and maintenance. Before selecting a system, inquire about service contracts, and check references. It is also very important to protect smoke detectors during operations that produce dust, smoke, or spray (e.g., cutting wood, spray painting, welding, burning, etc.). Spray or dust can accumulate on the inside of the detectors rendering them inoperative or causing false alarms. Ensure protective covers are removed and the system is operating when work has been completed for the day. Never leave a detector or system out of service overnight without providing additional fire watches.

Many cultural institutions feel that an excellent housekeeping and fire prevention program, combined with a state-of-the-art fire detection system, constitutes an optimal fire protection program. This level of fire protection may be suitable for the protection of fine art galleries housed in fire resistive buildings, where the total fuel load within the gallery is limited to a few paintings on the walls or sculpture on the floor. In this environment, ignition sources are easily controlled, and spread of fire from one object to the next is unlikely due to the physical separation of the fuel sources. In almost any other environment, however, fire is too unpredictable. Arson or other incendiary fires may be difficult to guard against. Lightning is a threat in certain parts of the world, and there are always the unforeseen careless actions we humans occasionally make. A fire detection system will be helpful provided that it: 1) responds quickly to the fire condition, and 2) human intervention is almost immediate. This latter point is especially critical since fire detectors can only *detect* a fire, and not extinguish it.

FIRE SUPPRESSION SYSTEMS

If one were to examine every cultural property (historic building, museum, library, place of worship, etc.) lost to a fire, the only factor they would share in common would be lack of an automatic fire suppression system. Many would have had good housekeeping programs, or fire detection systems, or have been constructed of non-combustible materials, but they were still total fire losses. Being properly prepared for a fire often means incorporating an automatic fire suppression system. A suppression system, designed to quickly control or extinguish a fire that is beyond the means of a portable extinguisher, is the best insurance against a large loss fire.

Generally speaking, only gas based or water based

automatic fire suppression systems are suitable for protecting cultural properties. Gaseous systems are suitable only for protecting the contents of a tightly sealed room that can contain the gas once it is discharged. Any breach to the room, e.g. open door or window, operating ventilation system, wall/floor openings around pipes or conduit, etc., will permit the gas to escape and void its usefulness in extinguishing the fire. Up until ten years ago "Halon" was the only gas available that was "safe" for use around people and collections. Halon was found to cause serious damage to the ozone, however, so further production was banned worldwide. Several replacement gases have been developed and are available (FM 200®, Inergen®, FE 13®, etc.), although none of them can be used as a drop-in replacement for Halon. Each gas can provide an effective and "clean" method to control fire in an enclosure, as long as the system is properly designed, tested, and maintained. The drawbacks to these systems include: a limited amount of agent; they must be adequately confined within the room of discharge; the discharge velocity of the gas must be considered (most systems are capable of blowing objects about the room); they require above average maintenance; and they do not protect the building structure.

An automatic sprinkler system is the single most important fire-safety system a cultural property can have.

The alternative to a gas based fire suppression system is a water based one, a.k.a. a sprinkler system. Immediately after the Windsor Castle fire (U.K.) in 1992, the Cabildo fire (New Orleans, LA) in 1988, the Byer Museum (Evanston, IL) in 1984 (and probably many other cultural fires), government or museum officials were heard to have made remarks along the lines of "good thing there were no sprinklers, otherwise the (water) damage would have been much worse." Unfortunately, many myths and misunderstandings regarding automatic sprinkler systems are entrenched in the minds of many people in the cultural field today. Many people in the cultural field also have an innate fear of having pipes filled with water overhead, a disaster waiting to happen. This fear is probably grounded in the many mishaps that occur with other piping systems, e.g. domestic water lines, roof and other drains, condenser lines, etc.

An automatic sprinkler system is the single most important fire-safety system a cultural property can have. In its simplest form, a sprinkler system is a network of overhead pipes (with or without water in them) connected to a water supply. Attached to these pipes, at regularly spaced intervals, are automatic sprinkler heads. Each sprinkler is held shut or sealed by an element that will melt or break away at a predetermined temperature (normally 135-165°F). In a fire situation, only the sprinkler head(s) nearest (exposed to) the fire will open and discharge water onto the fire. Not all sprinklers open, as many people believe. In fact, rarely does it take more than one or two sprinkler heads to control or extinguish a fire. Sprinklers can be looked upon as individual firefighters, standing by 24 hours a day. A typical sprinkler head, however, discharges about 20 gpm, while fire hoses may discharge 125-250 gpm. In addition, almost all water discharged from a sprinkler head goes onto the fire; whereas water from fire fighting operations may not always be directed onto the fire, thus causing unnecessary damage.

The various types of automatic sprinkler systems, briefly described below, all have certain common features. Each has a control valve where the system can be turned off, a waterflow alarm that activates when water movement occurs within the pipes (and generally transmits the alarm to a constantly attended control room), and an automatic sprinkler head which distributes the water.

Wet-pipe system— Overhead pipes are filled with water and the system is always ready for operation. This type of system is both the simplest and most reliable of all automatic sprinkler systems. A wet-pipe system should not be used in spaces subject to freezing temperatures or where mechanical damage to the pipes is likely.

Pre-action system— Overhead pipes are normally dry. A supplemental fire detection system *must* be

installed in the same area as the sprinklers. Activation of this supplemental fire detection system releases a valve that allows water to fill the pipes, essentially converting the system to a wet-pipe system. Water is not released until a sprinkler head is activated. This type of system minimizes the possibility of accidental water damage due to a sprinkler pipe or head being mechanically damaged. However, since a pre-action system is dependent upon a supplemental fire detection system to get water into the pipes, and has other moving mechanical parts, it requires much more maintenance and therefore its reliability in a fire situation, while very good, is not as high as the simple wet-pipe system. Pre-action systems are suitable for areas subject to freezing, provided the incoming water supply piping for the control valve is in a heated location.

Dry-pipe system— Overhead pipes are filled with air under pressure. The air pressure is significant enough to hold "closed" a valve that allows water into the system. Should a sprinkler head open, the air bleeds off and the water valve is allowed to open. Water then flows through the system and out the open heads. This type of system should only be used in areas subject to freezing. The use of dry-pipe systems in historic buildings should be limited to loading docks, unheated structures, etc.

Sprinkler systems can almost always be unobtrusively installed into historic buildings and other cultural properties. Automatic sprinkler heads are manufactured in a wide assortment of shapes, sizes, styles, and even colors, to meet practically any aesthetic consideration. Concealed heads are completely invisible, hidden by small cover plates that are flush to and the same color as the ceiling. Some low profile and recessed heads only project out from the wall or ceiling a fraction of an inch. Sprinkler piping can often be hidden along crown molding, or concealed within void spaces. Use of copper or plastic pipe can help reduce the size of the pipe, and sidewall sprinkler heads can be mounted along walls, often avoiding the need to run any pipes directly overhead. False soffits can also be created to hide piping and blend in architecturally. Of course hiring a sprinkler designer and installer sensitive to historic preservation needs is also important.

Preservationists must view protection of the property from fire as an essential goal of heritage preservation, and act accordingly.

Many building and fire codes now require installation of sprinklers because of their proven life safety capabilities. The odds of someone being killed by a fire in a fully sprinklered building are about as rare as that for sprinklers to accidentally operate due to manufacture's defect (practically nil). The advantages to installing a sprinkler system in a cultural institution should now be obvious:

- minimize fire damage (your greatest threat) to the building and its contents,
- drastically reduce water damage (resulting from fire fighting operations),
- prevent injury or loss of life,
- proven reliability.

Water mist fire suppression systems have been getting some publicity of late as a replacement for both sprinklers and gaseous systems. As the name implies, these systems produce very fine water droplets (similar to fog) for extinguishing engine room fires on ships. In fact, that is the only application where their use has been approved by codes or standards. Please beware of individuals trying to sell you on purchasing and installing a water mist system. The hope of transferring this technology to land based operations has not yet panned out, and may never do so. At the 1999 Annual Meeting of the National Fire Protection Association, a special forum on water mist technology was conducted by the experts in this field. They were unanimous in saying that this technology cannot and should not be transferred to any other application, unless the end user is willing to invest hundreds of thousands of dollars in testing for the specific end use application. As of this writing, water mist systems have proven to be ineffective in extinguishing small fires, even on ships.

SUMMARY

Historic buildings and other cultural institutions should be viewed as monuments to humanity, to be preserved for perpetuity. Sometime in the life of the building a fire is likely to occur. It may not happen this year or next, or for the next 100+ years, but eventually it will happen. If proper fire protection safeguards are not provided, then individuals, nations, and cultures will continue to lose their heritage to fire. Preservationists have the responsibility for avoiding these losses in or to historic buildings. The threat of destruction or damage from fire, must be weighed against the intrusion on historic fabric from installation of fire safety features. In the end, preservationists must view protection of the property from fire as an essential goal of heritage preservation, and act accordingly. A fire protection program should not be a choice, but a necessity.

FOR FURTHER READING

National Fire Protection Association. NFPA 909, *Standard for the Protection of Cultural Resources — Including Museums, Libraries, Places of Worship, and Historical Properties.* Quincy, MA. 1997

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

Morris, John. *Managing the Library Fire Risk.* University of California. 1979. ISBN 0-9602278-1-4

The Fire Protection Association. *Fire Protection in Old Buildings and Historic Town Centres.* London, UK. 1992. ISBN 0 902167 40-5

The Fire Protection Association. *Heritage Under Fire — A Guide to the Protection of Historic Buildings.* London, UK. 1992. ISBN 0 902167 94 4

Advisory Council on Historic Preservation and the (U.S.) General Services Administration. *Fire Safety Retrofitting in Historic Buildings.* 1989

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HISTORY NEWS TECHNICAL LEAFLET

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Closing the Barn Door: Dealing with Security Issues

BY STEVAN P. LAYNE, CPP, CIPM

Many of our most respected institutions, historic houses, and other cultural properties suffer from a common malaise—lack of security awareness. When no one can remember the last time property was missing, or someone acted suspiciously, or staff members felt threatened, it is easy to grow complacent and ignore some common sense practices. These practices work to deter crime, reduce liability, enhance life-safety, and protect assets.

In a recent informal survey of cultural institutions, 100% of the respondents advised that most recent losses were clearly related to inside sources—employee theft. The second leading cause of loss—staff complacency.

Though current technology offers numerous alternatives with all the "bells and whistles," it is not necessary to have the most expensive, most elaborate electronic scheme to protect the small to mid-sized facility. In fact, we find in many of our site visits that the facility has been long burdened by unnecessary costs in the installation, service, maintenance, or leasing of electronic systems. Alarm companies are not necessarily unscrupulous; they are, however, in business to sell you devices, gain recurring revenue through service and monitoring contracts, and there's no guarantee that the vendor knows any more than common electrical skills.

How then, may a facility with few staff members, low budget, and heightened protection concerns find practical, cost-effective solutions to protection problems? The solution is surprisingly simple, and within reach of institutions of any size, budget, or staff. We begin by paralleling the process applied by professional consultants—the gathering of information. You need to think about the level of protection you really need, the maximum amount you can spend, and what it is that you actually want to accomplish. Do you want to catch someone who might hide in the building until after closing, detect entry from a basement window, or call the police when there is a dangerous visitor? Once you have put together this basic information, the next step is determining what you need, and where to get it: [1]

Sample devices.

1. Is the company reputable?
2. Is the company experienced?
3. How long have technicians been employed?
4. Is the company licensed? Current license?
5. Do they have experience with similar systems?
6. Do they have the staff and resources to respond to after-hours service calls? Time for average response?
7. Have other clients filed complaints?
8. Are all employees screened, licensed, bonded?
9. Is a list of other clients/contacts available?
10. Is the company insured? Coverage limitations?
11. Is the contract beneficial for both parties?
12. Is the company nationally affiliated?
13. Do they distribute devices and parts nationally?
14. Are all costs for installation, service, parts replacement, or service calls spelled out in the contract?
15. Is there a written document that tells you exactly what you are getting, and what it will do?

You need to present your list of objectives, or if possible, more specific detail about the systems you want if you have that information. The most desirable method, of course, would be to have a non-product affiliated firm or individual provide detailed specifications suitable for putting out to bid. In absence of specifications, you should be able to describe the systems and/or devices you seek. An institution should put out to bid the specifications, or description of systems, with no less than three competing vendors.

Security officers, or anyone assigned the responsibility, use handheld scanners to record the time and location of each "station" checked. The information is downloaded to a computer, producing a daily written record of each location checked within the building. Photo courtesy of author.

Many smaller institutions question the need for electronic protection, citing the lack of funding for any protection needs. "It is the duty of all museum operators to take reasonable steps to reduce the risk of a reasonably foreseeable type of loss from occurring to any object in the collection while on the museum property, on loan, or in transit, by the action of unknown third parties, staff or visiting scholars, or through fire, flood or similar natural disaster or other foreseeable forces of people or nature." [2]

Many institutions, especially those with a small staff, find it difficult to provide full time security staff. The next best alternative is the installation of electronic systems. Even when security officers are present, the use of electronic systems helps to monitor areas that cannot be observed at all times. "All museums shall have intrusion detection and signaling systems. These systems should be monitored 24 hours per day, 7 days per week." [3]

Alarm systems and video surveillance systems are intended to deter losses from both outside and internal sources.

Physical and mechanical barriers are necessary, they also help to eliminate potential problems from employee involvement, by limiting the institution's exposure to dishonest employees, those with substance problems, and persons who have displayed unsavory characteristics in the past. We agree that one mistake should not ruin someone's chances to be productive. That is why federal law prohibits denying employment to persons who have been convicted of a single crime (unless that crime is directly related to the type of employment). For example, you would not hire a convicted pedophile to supervise a museum program for children. What the civil courts have declared, on numerous occasions, is that employers are obligated to perform a *reasonable* inquiry into each applicant's background and character. You need to take this very seriously, regardless of the

[1] From *The Cultural Property Protection Manual,* LCI Revised 2001

[2] See *Suggested Guidelines in Museum Security* Sect. 1.0 Duty to Protect the Collection Section 1.1

[3] See *Suggested Guidelines in Museum Security* Sect. 6.0 Burglar Alarms/Security Electronics Sect. 6.1

size and makeup of your staff. The fact is that every category of employee—including directors, curators, volunteers, and contract employees—has been stealing from collections. Without exception, everyone with access to the facility, especially those with access to the collection, should undergo the following:

- Completion of an objective application form
- Verification of information submitted on the application
- Conduct of a criminal history check
- Credit history
- Verification of former employment
- Verification of education
- Completion of a personal interview

If you are unable to verify any of the information presented, you should not hire. Volunteers are no exception. You need to check anyone with access to the collections. You even need to check contractors doing work, unsupervised, on your property. Use a separate form for contractors to complete, verifying their compliance with the requirement to perform criminal histories on their own employees. [4]

Each facility faces different threats to its protection based on location, area crime, type of collection, and possibly, political environment. We know it takes a combination of physical security, natural barriers, electronic security, and personnel procedures to effect a positive protection plan. It's never too late to "close the barn door," especially after known losses occur.

THE RIGHT WAY TO "CLOSE THE BARN DOOR"

A common source of loss is actually the failure to properly secure the facility at the close of the day. Too often, open windows, unsecured doors, or equipment left running are the causes of fires, ease of unauthorized entry, or the failure to find "stay behinds."

The process is simple, common sense, but most often neglected. Assign someone within the organization to take full responsibility for locking up. Whether this is a security person, administrator, supervisor, even contract security, there needs to be a daily process which

Contractor Requirements

1. All contractor personnel will complete a police records check through Federal, State, Local, or commercial sources. A list of personnel showing their date of birth and the results of criminal history checks must be returned to the client, Attn: Security Manager, prior to the commencement of work.

2. Contractors will enter and exit the building only at an entrance designated by the client. Photo identification will be provided at the point of entry. Each contractor employee will be issued an ID Badge, which must be displayed at all times while on client property.

3. A work schedule will be submitted one week in advance to the Security Manager, listing arrival and departure times, areas where work will be performed, and personnel involved.

4. Use of power tools, nail hammers, or special equipment will be listed in the work schedule.

5. All tools and equipment will be secured at all times in the work area. Contractors are responsible to secure their equipment.

6. All tool cases, equipment cases, lunch boxes, other containers may be checked by client security officers upon exiting the building.

7. No interruption of power, water, or other utilities will be done without prior coordination with the facility maintenance supervisor.

8. Alarm systems, devices, wiring, or control panels will not be moved, utilized, or disturbed in any way without prior coordination with the facility maintenance supervisor.

9. Contractor personnel must remain in the work area, except for use of restrooms closest to the area, vending machines in or near the work area, or public areas. Contractor personnel will not enter other non-public areas of the facility without client escort or pre-approved authorization. Breaks will be taken in areas pre-arranged with the client.

10. No client property will be moved, covered, or work performed within five feet without prior coordination with the client.

Other restrictions may be added, as needed, by mutual agreement between the contractor and the client.

[4] See Contractor Requirements (above)

requires following a prescribed sequence, and also requires documentation of compliance.

The Daily Closing Checklist (on page 5) should be utilized by whomever actually performs the task of checking and locking up. If you can afford it, an electronic system may be utilized to assure that areas around the building are checked each night. No matter how it is done, or by whom, it must be done. It is important to disconnect any potential source of fire, such as coffee pots, space heaters, or other electronic devices at the close of business each day. It is also important to close and secure all windows and all exterior doors. Each interior space, to include rest room stalls, equipment rooms, janitors' closets, and offices must all be checked to ensure that no one has hidden within the building. It is easy to assume that because a door is closed, no one is inside. However, intruders often use this ploy to gain free access to a building. Alarm systems do work but may easily be bypassed by those who understand the system, particularly if they have once had legitimate access to your system codes and control panel locations. You need to take advantage of every aspect of protection procedures to deter the acts of potential intruders, especially former or present employees.

Unruly Patrons

Dealing with unruly patrons, undesirable patrons, or those who for other reasons are banned from entry creates a situation that many smaller institutions are not fully prepared to deal with. Of course you may call the police whenever these situations arise, but do not always rely on police for instantaneous response. And unless you have fulfilled certain legal requirements, police can only ask someone to leave. They are not, in fact, trespassing, until they have violated a lawful order, or posted notice not to be present on your property. It is not the daily task of staff members to deal with these problems, without the proper documentation and published policy of the institution. Thus, the first step in dealing with potential problems is to formulate and publish the institution's policy for removing persons from the property.

The following is a generic outline of how you might form your policy:

Code of Conduct

In order to deal effectively with the removal of any person from a public institution, it is necessary to establish parameters, or "rules of engagement," more or less. If you place yourself in the shoes of the subject of removal, you would certainly hope that there is a good reason behind the request to leave. As a visitor, you may be unaware of a rule you have inadvertently violated. It makes sense, therefore, to determine, publish, and disseminate a definite list of rules, or code of conduct, violation of which may lead to ejection. While reasonable rules or acceptable conduct may vary with the type of institution and operating philosophies, the list of violations below may be suited for application in most institutions:

- Use of or under the influence of alcohol or drugs
- Non-compliance with reasonable standards of personal hygiene
- Refusal to follow directions of institutional staff
- Consumption of food or beverages in exhibit area
- Violation of controlled or restricted area
- Continual violation of exhibit barriers
- Failure to control minor children
- Attempted theft or vandalism
- Interruptive behavior
- Spousal abuse
- Child abuse

Documentation

Once a violation is determined, it is important to document everything, how the determination was made, such as "reported by a patron," or "observed by video surveillance," or "confronted staff member." Violation of known or posted rules is an "incident" and should be recorded as such on the proper incident report form.

First Response

Initial response to incidents should also be a matter of practiced procedures. In many institutions, it is common practice to "call security" for everything. However, this tends to undermine the real intent of on-site security. When used excessively it interrupts normal operations and lessens the ability of other staff to deal with these everyday events. When a violation or potential violation occurs within view of a staff member, it is that staff member's responsibility to take immediate action directly or by notifying someone else, according to protocol—as long as that action does not place the staff member in any jeopardy. For example, if a patron is too close to an object, it is a simple matter for the staff member to say, "excuse me, but we ask everyone to stay at least two feet back from the object."

As long as the patron complies and there is no confrontation, the problem is solved, and there is no need to call anyone. Protocols should be in place so staff members will know what type of incident should be immediately reported to a higher-up or security—like a fight.

Non-Compliance

If, however, the patron refuses to comply, the incident is escalated to the next level of response. This may be a staff supervisor, or a security officer. Your written policy defines how you want such confrontations to be handled. It is advisable to settle these matters as quietly and as professionally as possible. Once the incident has reached the level where the institution, by *pre-defined* policy, dictates they be asked to leave, the next level of response is necessary.

DAILY CLOSING CHECKLIST

Function	Date/Employee	Date/Employee
1. Lock all exterior doors.	_____/_____	_____/_____
2. Check all rooms, closets, storage areas.	_____/_____	_____/_____
3. Disconnect all special devices, heaters.	_____/_____	_____/_____
4. Open all cash drawers, register drawers.	_____/_____	_____/_____
5. Activate interior alarms.	_____/_____	_____/_____
6. Upon exiting, activate perimeter alarms.	_____/_____	_____/_____
7. Identify persons found on the property.	_____/_____	_____/_____
8. Check all out buildings, sheds, storage.	_____/_____	_____/_____
9. Check parking lots, noting license #(s).	_____/_____	_____/_____
10. Log all discrepancies, unusual incidents.	_____/_____	_____/_____
11. Check building exteriors.	_____/_____	_____/_____
12. Special Checks:	_____/_____	_____/_____
13. Re-check heaters, electrical appliances.	_____/_____	_____/_____
14. Make additional walk-through inspection.	_____/_____	_____/_____
15. Set night lighting as instructed.	_____/_____	_____/_____
16. Observe exterior before exiting building.	_____/_____	_____/_____
17. Exit designated door and secure.	_____/_____	_____/_____
18. Check exterior doors and windows.	_____/_____	_____/_____

NOTE: NO ONE is authorized in building during closing procedures. Check entire building before proceeding. If suspicious persons or vehicles are near exit, contact police and request escort.
BE ALERT/BE SAFE!!

Ejection Procedure

You have to determine who has the authority to cause someone to be ejected, and how this procedure will take place. Your options include:

- **Staff Supervisor** – Requests violator leave immediately by closest public exit.
- **Security Supervisor** – Advises violator they must leave, escorts to closest public exit.
- **Police Officer** – Removes violator based on signed complaint of institution representative.

No two situations are alike. Whoever handles the incident needs to be versatile, cool and calm under stressful situations, and prepared to act immediately if necessary. It is desirable to have this procedure take place quickly and quietly. The more people who become involved, the longer the situation is drawn out, the more likely it is to become escalated. Staff members need to be aware that as long as they handle the incident without additional assistance, it is more likely to be solved peacefully. In fact, a common tactic is for a staff member to advise the subject to leave now, because once security or the police or called, they may be arrested.

All staff members must be aware that anytime a physical confrontation takes place, and anyone representing the institution puts their hands on a violator, that person is going to jail. No one should be considered for removal unless probable cause exists to believe that individual has violated known and published rules, regulations, or standards of behavior. If the violation doesn't warrant an arrest, then the subject should not be restrained or detained in any manner.

SUMMARY

You must have a complete list of rules for conduct; by staff, visitors, and others. Complete reporting and documentation must accompany every incident, even if nothing more than a verbal confrontation. Use security and/or police sparingly. Once the decision is made to remove, follow through as quickly as possible. Be professional. Do not let someone's overheated emotions come into play, especially if that person is a staff member.

For additional information about protection of cultural properties, visit The International Foundation for Cultural Property Protection at www.IFCPP.org

or contact:

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REFERENCES

Suggested Guidelines in Museum Security — ASIS Museum, Library, and Cultural Property Committee

The Cultural Property Protection Manual — Layne Consultants International

The International Foundation for Cultural Property Protection — www.IFCPP.org

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AASLH
TECHNICAL LEAFLET #234
A PUBLICATION OF THE AMERICAN ASSOCIATION FOR STATE AND LOCAL HISTORY

Disaster Planning, Preparedness, and Recovery: A Resource Guide

By April McCauley and Bethany L. Hawkins

Disasters that impact museums and historical organizations include floods, hurricanes, tornadoes, winter storms, extreme cold, earthquakes, volcanoes, tsunamis, fire, hazardous substances, nuclear power plant accidents, nuclear weapons attack and radioactive fallout, chemical spills, riots, and terrorism. For local history organizations, pests in the collection can also constitute a disaster. Contemplating all of the things that can go wrong can quickly lead to a sense of futility. However, by identifying, prioritizing, and addressing these dangers with a thoughtful plan of action for prevention and response, the situation can appear to be much less dire.

The good news is that there are myriad resources available to assist and guide organizations of all sizes with planning. This technical leaflet presents many of those resources. While every attempt has been made to provide the reader with current, accurate information, the authors and AASLH neither endorse nor assume responsibility for any particular resource, organization, service, or product.

Online Resources

- The September 2005 issue of the **Western Association of Art Conservation (WAAC) Newsletter** focused on salvage of paper, textiles, three dimensional artifacts, and fundamental information on mold. Copies can be ordered at palimpsest.Stanford.edu/waac/.

- **The Northeast Document Conservation Center** (NEDCC: www.nedcc.org) has published technical leaflets on disaster recovery and a comprehensive Web site specifically devoted to links and information about hurricane recovery including funding sources at www.nedcc.org/news/hurricane.htm.

- **The National Park Service** publishes Conserve-O-Grams on a variety of topics including disaster response and recovery and security, fire, and curatorial safety. These can be found at www.cr.nps.gov/museum/publications/conserveogram/cons_toc.html.

- **The National Center for Preservation Technology & Training** has resources for condition assessment and disaster management at http://www.ncptt.nps.gov/default.aspx?m=208.

- **The American Institute for Conservation of Historic & Artistic Works (AIC) Web site** includes publications on disaster response and recovery and other conservation topics at aic.Stanford.edu/library/online/disaster/index.html. The Journal of the American Institute for Conservation has also included disaster response and recovery articles, which are also available at this Web address.

- **The National Trust for Historic Preservation** includes advice for salvaging flood-damaged historic structures at http://www.nationaltrust.org/hurricane/index.html.

- **Solinet** includes a comprehensive list of funding sources on its site at http://www.solinet.net/Disaster_templ.cfm?doc_id=3789.

- **The Museum SOS site, hosted by the American Museum of Natural History,** is labeled "a comprehensive resource for museum disaster preparedness and response." It includes "presentations, case studies, and other resources related to protecting your collections" and a list of links to other resources at http://www.museum-sos.org/htm/index.html.

- **The U.S. National Archives and Records Administration** includes emergency preparedness information specifically targeted at archivists at http://www.archives.gov/preservation/emergency-prep/.

Rust developed on a damp textile after a metal artifact landed on it during Hurricane Katrina, Old Spanish Fort, Pascagoula, MS.

- **The Regional Alliance for Preservation Web site** at http://www.preservecollections.org/index.php includes lists of educational opportunities, services, and publications. Searching their bibliography for emergency preparedness will lead you to over three dozen articles from member publications.

- **The Bibliographic Database of the Conservation Information Network** allows searches of "a worldwide network of libraries and documentation centres [that] contribute data on their combined holdings." These include books, conference proceedings, technical reports, journal articles, theses, and more. Begin your search at http://www.bcin.ca/English/home_english.html.

- **The Canadian Conservation Institute** lists several publications and includes a conservation information database on its Web site at http://www.cci-icc.gc.ca/main_e.aspx.

- **The American Association of Museums** includes hurricane recovery information on its Web site at http://www.aam-us.org/aamlatest/news/HurricaneRecoveryInfo.cfm. The AAM bookstore includes several titles on facilities and risk management.

- **The Heritage Emergency National Task Force** is co-sponsored by Heritage Preservation and the Federal Emergency Management Agency. Its Web site, www.heritagepreservation.org/PROGRAMS/TFresources.html, includes preparedness and recovery information and links to other resources.

- **The Smithsonian Institution** has listed resources on its Web site at www.si.edu/scmre/takingcare/disaster.htm.

Books, Articles, and Other Publications

Abstract descriptions are taken from the **Bibliographic database of the Conservation Information Network** at http://www.bcin.ca/English/home_english.html.

Preparedness, General

Alire, Camila, ed. Library Disaster Planning and Recovery Handbook. New York: Neal-Schuman Publishers, 2000.

ASEAN Committee on Culture and Information. Guidelines on the Principles of Emergency Planning and Disaster Management for Museums, Libraries and Archives. ASEAN Committee on Culture and Information, 1999.

Becker, Alyssa, Elizabeth Richards, Shirley Ellis, and Shawna Lemiski. "The University of Alberta Clothing and Textiles Collection Disaster Contingency Plan." Edmonton: University of Alberta, Department of Human Ecology, University of Alberta Clothing and Textiles Collection, 2001.

Brooks, Connie. "Cooperative and Regional Disaster Preparedness." The Book and Paper Group Annual 5 (1986): 139-145.
Abstract:
Regional disaster preparedness differs from cooperative disaster preparedness because a systematic attempt is made to involve all institutions of a certain type (not just libraries) in cooperative disaster preparedness. The article cites benefits including the increased feasibility of setting up joint training sessions in salvage procedures.

Cato, Paisley S. and Stephen L. Williams. "Guidelines for Developing Policies for the Management and Care of Natural History Collections." Collection Forum 9, no.2 (1993): 84-107.
Abstract:
Puts forward a set of guidelines which address the major issues in the management of natural history collections, including ethics, documentation acquisition, preventive conservation, access, loans, sampling, treatment, pest control, health and safety, emergency preparedness, and deaccessioning.

Center for Occupational Hazards. "Emergency Plans for Museum Conservation Laboratories." COH: Conservation Hazard Data Sheets. New York: Center for Occupational Hazards, 1986.
Abstract:
This data sheet discusses procedures for writing an emergency plan to prevent or reduce damage in the event of a natural or mechanical disaster. Topics include: types of emergencies, elements of an emergency plan, planning, hazard evaluation, role of museum staff, communications, evacuation, chemical spills, fumigation emergencies, shutdown procedures, training, drills and evaluation, references, and sources of assistance. This is a reference for emergency and disaster planning and preparedness, and also for occupational safety and health in cultural institutions.

"Cultural Resource Protection and Emergency Preparedness." Cultural Resources Management 24, no. 8 (2001): 3-36.

Dorge, Valerie, and Sharon L. Jones. Building an Emergency Plan: A Guide for Museums and Other Cultural Institutions. Los Angeles, CA: Getty Conservation Institute, 1999.

Dorge, Valerie, Wilbur Faulk, and Juan Manuel Martinez. "Emergency Planning for Cultural Institutions: the Process and Some of Its Challenges." ICOM Committee for Conservation, ICOM-CC: 13th Triennial Meeting, Rio de Janeiro, 22-27 September 2002, London: ICOM-CC; James & James, 2002: 27-33.
Abstract:
Every cultural institution should have an emergency plan based on the vulnerability of its staff, visitors, collections, and buildings to potential natural and human-caused emergency situations or disasters. Developing a plan is the most important preventive conservation step an institution's director and staff can take. This paper reviews the basics of the emergency preparedness and response process that results in an emergency plan. Some of the challenges the institution can face are addressed and specific examples given of the ongoing process at a small museum in Santiago, Chile. Also, words of advice are offered by some who have developed a plan, had it tested in a real emergency, and revised it accordingly.

Drabek, Thomas E. "The Events of an Emergency." Perspectives on Natural Disaster Mitigation: papers presented at 1991 AIC Workshop. Ed. Jane K. Hutchins and Barbara O. Roberts. Washington, D.C.: Foundation of the American Institute for Conservation of Historic and Artistic Works, 1991: 31-36.

Abstract:
The author interviewed executives who manage tourist businesses to identify tourist locations where local governments have implemented disaster evacuation planning initiatives. Most of the businesses were hotels, motels, restaurants, or entertainment complexes; a few were museums. The author discovered that in 91% of these 65 firms, some type of disaster planning had been done, but serious voids emerged when he began to probe. The report introduces seven topics: vulnerability assessment, some unique features of disasters, comprehensive emergency management, the mitigation function, the preparedness function, the response function, and the recovery function.

❁ Heritage Collections Council. Be Prepared: Guidelines for Small Museums for Writing a Disaster Preparedness Plan. Canberra: Heritage Collections Council, 2000.

❁ Hughes, Janet. "A Strategy to Increase Cooperation for Disaster Preparedness: Some Australian Examples for Saving Resources and Raising Awareness." Prevention 2000: Prevention of Disasters in Cultural Storage Areas, November 2000, 7-10.
Abstract:
A 1998 report by the Australian National Audit Office found many deficiencies in disaster preparedness at four major national cultural institutions in Canberra, Australia. While it was recognized that many deficiencies were due to lack of resources, it was nevertheless necessary to urgently address these problems. As a result, cooperation strategies were developed by representatives from all cultural and scientific institutions in the city to improve preparedness. This has included the development of a Memorandum of Understanding providing for mutual emergency assistance; sharing of information and equipment; and joint training to reduce costs and improve efficiency. Training strategies stress the importance of ensuring disaster awareness at all levels of responsibility, including senior executives. Several different models for disaster preparedness cooperation used in Australia and elsewhere are briefly compared. The Canberra model could be modified to suit many different situations where museum professionals must achieve results with limited staffing and restricted funding.

❁ Preservation Services Department. "LEAP Disaster Response Manual Draft." Smithsonian Institution Library: 7.
Abstract:
The Library Emergency Action Program (LEAP) Disaster Response Manual is a guide to help in the recovery of library materials AFTER a disaster has passed. It's purpose is to help increase the safety and efficiency of a recovery effort.

❁ Look, David W. and Dirk H.R. Spennemann. "Disaster Preparedness, Planning, and Mitigation." Cultural Resource Management 24, no.8 (2001): 3-4.

❁ Lord, Allyn; Carolyn Reno; and Marie Demeroukas. Steal This Handbook: a Template for Creating a Museum's Emergency Preparedness Plan. Columbia, S.C.: Southeastern Registrars Association, 1994.
Abstract:
Covers all aspects of emergency preparedness, response, and recovery, and includes both major disasters and everyday, potentially dangerous situations.

❁ Mattingly, Shirley. "Urban Emergency Planning and Preparedness." Perspectives on Natural Disaster Mitigation: Papers Presented at 1991 AIC Workshop. Ed. Jane K. Hutchins and Barbara O. Roberts. Washington, D.C.: Foundation of the American Institute for Conservation of Historic and Artistic Works, 1991: 9-16.
Abstract:
Focuses on local government's role in regard to disasters which threaten the community; describes preparedness programs and actual response of a local government; and provides practical suggestions for protecting collections and personnel.

❁ McClure, Frances D. "Emergency Preparedness—Chapter 3." Managing Preservation: A Guidebook, January 1995: 21-51.
Abstract:
Every year most libraries encounter some type of emergency, usually the result of water from sprinkler systems, leaking pipes, fire hoses, or heavy rain. The severity of these emergencies and recovery from them depend on prevention strategies and emergency preparedness plans that have been developed and implemented by the library staff. In this chapter, basic information is provided to help any library establish strategies to avoid preventable damage and develop emergency preparedness plans to cope with the unpreventable in the worst-case scenario; it is also applicable on a smaller basis for minor emergencies.

❁ Nelson, Carl L. Protecting the Past from Natural Disasters. Washington: Preservation Press, National Trust for Historic Preservation, 1991.
Abstract:
In this practical guide, the National Trust shows how everyone who cares for our past can prepare for, respond to, and recover from the next natural disaster. Also provides insights into the human stories behind

Artifact recovery at Beauvoir, the Home of Jefferson Davis, Biloxi, MS.

the recoveries of Charleston and the Virgin Islands from Hurricane Hugo and San Francisco from the Loma Prieta earthquake of 1989.

❁ Podany, Jerry C. "Emergency Preparedness Plan: Developing One and Practicing It." Perspectives on Natural Disaster Mitigation: papers presented at 1991 AIC Workshop. Ed. Jane K. Hutchins and Barbara O. Roberts. Foundation of the American Institute for Conservation of Historic and Artistic Works, 1991: 69-82.
Abstract:
Provides a scheme for developing an emergency response plan covering the issues to be addressed by the plan, the composition of the planning committee, the documents to be produced by the committee, and testing of the completed plan in various kinds of drills. The author appends excerpts from the J. Paul Getty Emergency Planning Handbook.

❁ Preiss, Lydia. "Learning from Disasters: a Decade of Experience at the National Library of Australia." International Preservation News no. 20 (1999): 19-26.

❁ Roberts, Barbara O. "Emergency Preparedness." A Preventive Conservation Approach, Volume 1, Storage of Natural History Collections. Ed. Carolyn L. Rose, Catharine A. Hawks, and Hugh H. Genoways. Society for the Preservation of Natural History Collections, 1995: 81-99.
Abstract:
Emergency preparedness is a way to minimize risk to personnel, collections, and facilities. The effects of unexpected events can be minimized and normal institutional operations can resume quickly if all staff members are trained to deal with emergency incidents. Effective emergency preparedness involves planning and an understanding of appropriate actions for response and recovery.

❁ Roy, Charity. "Disaster Recovery: Developing a Plan." Cultural Resource Management 24, no. 8 (2001): 13-15.

❁ Saito, Hidetoshi, ed. "Risk Preparedness for Cultural Properties: Development of Guidelines for Emergency Response." 1997 Kobe/Tokyo International Symposium. Tokyo: Chuo-Koron Bijutsu Shuppan, 1999.

❁ Scott, Catherine D., Caroline Shugars, and Susan Vanhaften-Mackler. "Selected References on Disasters and Disaster Planning: Earthquakes, Fires, Floods, and Other Disasters in Cultural Institutions." Washington, D.C.: Smithsonian Institution Libraries, Museum Reference Center, April 1983.
Abstract:
This bibliography, compiled by the Museum Reference Center of the Smithsonian Institution Libraries, contains references relating to the following topics: security, fire (detection, extinguishing), floods, natural disasters, earthquakes, bomb threats,

vibration, building codes, insurance, planning, cleanup, theft, risk management, acid rain, emergency treatments, vandalism, disorder, environment (temperature, relative humidity, light, pollution, dust, mold, insect infestations), and handling. This bibliography is a reference for emergency and disaster preparedness for museums, libraries, art galleries, archives, and related cultural institutions. References are dated from 1975 to 1983.

Toronto Area Archivists Group Education Foundation. An Ounce of Prevention: a Handbook on Disaster Contingency Planning for Archives, Libraries and Record Centers. Ed. John P. Barton and Johanna G. Wellheiser. Toronto: Toronto Area Archivists Group Education Foundation, 1985.
Abstract:
Published in conjunction with a symposium on disaster preparedness for information managers, this handbook is intended to heighten awareness about and to assist archives, libraries, and record centers in disaster contingency planning. It discusses methods of preventing disasters and, should one occur, ways of containing and minimizing it through advance planning. It outlines action to be taken when disaster strikes, salvage operations, the rehabilitation of salvaged materials, fumigation and sterilization, and the completion of the recovery operation. Extensive appendices list human resources, suppliers of emergency facilities, services, and materials, etc.

Tremain, David. "Charred Documents." Help! a Survivor's Guide to Emergency Preparedness. Ed. Cynthia Ball and Audrey Yardley-Jones. Edmonton: Museums Alberta, 2001: 149-150.

Wright, Gordon H. "Disaster Management for Libraries: A Management Perspective on Disaster Planning." Emergency Preparedness Digest 16, no. 1 (January 1989): 14-18.
Abstract:
A review of the factors that come into play when managing disaster recovery; emphasis on communications. An excerpt from Disaster Management for Libraries, by Claire England and Karen Evans, (Ottawa: Canadian Library Association, 1988).

Earthquake

Cornu, Elisabeth and Lesley Bone. "Seismic Disaster Planning: Preventive Measures Make a Difference." Newsletter (Western Association for Art Conservation) 13, no.3 (September 1991): 13-19.
Abstract:
Following the October 1989 earthquake, objects conservators from the M.H. de Young Memorial Museum in San Francisco report what they learned about effective earthquake preparedness measures. The systematic approach to preparedness that is presented includes details about how to assess the museum building, how to prepare and train staff for a seismic disaster and its aftermath, and how to successfully anchor objects to provide better seismic security. Detailed instructions and sketches about how to mount and store various kinds of museum objects are provided. Appendices include supplies for emergencies and sample damage report.

Feilden, Bernard Melchior. Between Two Earthquakes: Cultural Property in Seismic Zones. Rome; Marina del Rey: ICCROM; The Getty Conservation Institute, 1987.
Abstract:
A handbook providing information on conserving historic buildings, monuments and archaeological sites in earthquake-prone areas. Focuses on three areas of concern: what to do before the earthquake, what to do immediately after, and what long-term actions remain to be taken. Thirteen appendices include fire protection of historic buildings, computerized listing of data on historic buildings, photogrammetry and earthquakes, planning to protect an institution and its collections, modified mercalli intensity scale, from restoration to maintenance of historic buildings, damage recording sheets, structural interventions in historic buildings, the resolution on cultural property in seismic zones. Bibliographic references.

MacIntosh, Heather. "Responding to Nisqually: Historic Seattle's Role After the Earthquake." Cultural Resource Management 24, no. 8 (2001): 8-10.

Sullivan, Michael Sean. "The Nisqually Earthquake." Cultural Resource Management 24, no. 8 (2001): 10-12.

Fire

Babin, Angela. Fire Prevention. New York: Center for Safety in the Arts, 1989.
Abstract:
This data sheet describes how fires start, and methods to prevent and extinguish them. Topics include the fire triangle (fuels, oxidizers, ignition source, plus fire propogation); definitions (flammable range, flash point, flammability, combustibile, vapour pressure, auto-ignition tempreture); storage conditions and containers; handling (dispensing, spills and leaks); types of fires (class A-common solids, class B-flammable liquids, class C-electrical equipment, class D-burning metals); fire extinguishers (class A types, class ABC multipurpose dry chemical, class ABC Halon

211, class BC Carbon dioxide); automatic sprinkler systems (water, halon); and fire fighting procedures. References. This is a reference for occupational safety and health, and for emergency and disaster planning and preparedness.

Flood/Hurricane

❁ Kiseljev, Dubravka Turkovic. "Rescuing Water Damaged Textiles During L.A.'s Urban Riots." American Institute for Conservation of Historic and Artistic Works, Textile Specialty Group 3 (1993): 39-45.
Abstract:
During the April 1992 urban riots in Los Angeles, a number of costumes and textiles in the study collection at the Los Angeles County Museum of Art were damaged in an off-site storage area. Water damage in the storage area resulted in the need for emergency treatment on a number of artifacts. This article details the course of action and the rescue effort. It also offers advice for those developing disaster preparedness plans.

❁ Klempan, Barbara. Emergency Treatment of Water-Damaged Paintings on Canvas. Ottawa: Canada. Department of Canadian Heritage. Canadian Conservation Institute, 1986.
Abstract:
Water damage is one of the most serious types of damage that can occur to a collection of paintings on canvas. This document discusses the effects of water damage, how to remove excess water, recommended materials, and how to dry water-damaged paintings. A list of suppliers and a supplementary bibliography are included. The information in this note could be useful for disaster planning and emergency preparedness, as well as for mitigating the immediate effects of water damage.

❁ Mathieson, David F. "Establishing Workable Policies for Dealing with Storm Threats." Technology & Conservation 8, no. 2 (1983): 28-29.
Abstract:
Museums, libraries, and similar facilities that are located in hurricane-prone regions, should develop written emergency preparedness procedures to minimize damage from both high winds and water inundations.

❁ Noble, Bruce J., Jr. "Lord Willing n' the Creek Don't Rise: Flood Sustainability at Harpers Ferry National Historical Park." Cultural Resource Management 24, no. 8 (2001): 16-18.

❁ Tsai, Fei-Wen; and Dianne van der Reyden. "Disaster Preparedness—Prevention, Response and Recovery Procedures for Water-Based Emergencies: Paper-Based and Magnetic Media Materials." The Symposium on the Conservation and Preservation of the Cultural Properties: On Preservation and Disaster Planning, 1996: 462-498.

Main Building, Los Islenos Museum, St. Bernard Parish, LA.

Pests

❁ Olkowski, William, Sheila Daar, and Helga Olkowski. "Checklist for Detecting Structural Decay in Wood Buildings." Common-Sense Pest Control: Least-Toxic Solutions for Your Home, Garden, Pets, and Community, 1991.

Volcano

❁ Schoonover, Larry. "Mount St. Helens: Cleaning Tips and Conservation Concerns." Inland Empire Museum Association Newsletter 3, no. 1: 3.
Abstract:
This newsletter article reports on the effects of volcanic ash from the 1980 eruption of Mount St. Helens, Washington state, USA, on cultural institutions and their collections, and describes methods to reduce damage. Some recommendations include shutting down air intake systems, sealing up museum facilities (doors, windows), frequent filter changes of HVAC systems, covering objects and storage cabinets, and controlling (stabilizing) the environment. Chemical analysis of the abrasive ash revealed at least 50 per thousand silica dioxide, which forms damaging sulphuric fumes when exposed to moisture. Removal of the fumes and careful cleaning to remove ash are advised. This newsletter is a reference for emergency and disaster preparedness and planning and salvage (retrieval) operations.

Photos provided by AASLH HEART volunteers.

Disaster Planning, Preparedness, and Recovery Resources from AASLH

- *History News* Vol. 54, No. 3. Are You Prepared for Disaster? (Summer 1999)
Summary: Articles in this issue include "Partnerships in Disaster Planning Response: A National Perspective," by Jane S. Long; "Focus on Recovery: The Hermitage, The Home of President Andrew Jackson and Its Tornado," by James M. Vaughan; and "Building Museums That Last," by Rick Beard.

- *History News* Vol. 48, No. 1. Emergency Preparedness (January/February 1993)
Summary: Articles in this issue include: "Are You Ready When Disaster Strikes?" by Wilbur Faulk; "A Test of Strength," by Nancy Bernard Felix; "Sharing the Risk," by Gail McGiffen and Scott E. Smith; "Points of View," by Pamela J. Bennett; and "Preserving A Legacy," by John Fleming. Date Published

- Technical Leaflet #50: Insuring Against Loss, published: 1969.

- Technical Leaflet #114: Emergency Preparedness for Museums, Historic Sites & Archives: An Annotated Bibliography, published: 1979.

- Technical Leaflet #147: An Insurance Primer for the Local Historical Organization, published: 1983.

- Technical Leaflet #171: A Holistic Approach to Museum Pest Management, published 1990.

- Technical Leaflet #183: Disaster Planning for Cultural Institutions, published 1993.

- Technical Leaflet #206: Protecting Cultural Heritage Properties from Fire, published 1999.

- Technical Leaflet #220: Closing the Barn Door: Dealing with Security Issues, published 2002.

Note: Technical Leaflet Bundle #BNDL004: Risk Management includes technical leaflets #147, #171, #183, #206, and #220.

These resources can be purchased through the AASLH Bookstore at http://www.aaslhnet.org/aaslhssa/ecessashop.shopping_page or by calling 1-615-320-3203.

Doll showing mold growth after Hurricane Katrina damage, Old Spanish Fort, Pascagoula, MS.