Care and Maintenance

Recommendations for Artwork in the Fine Arts Collection
U.S. General Services Administration

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The Fine Arts Collection
U.S. General Services Administration

U.S. General Services Administration
Office of the Chief Architect
Design Excellence and the Arts
Fine Arts Program

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Introduction

The Fine Arts Collection represents the history, culture, and ideals of America. GSA is committed to properly maintaining and conserving these works of art so they can be both a joy and inspiration today and for the future.

Introduction

The Fine Arts Collection of the U.S. General Services Administration (GSA) includes commissioned civic works of art that enhance the architecture of federal buildings; portable works of art commissioned under the federal patronage of the New Deal; works of art purchased with Art in Architecture (AiA) funds; and maquettes. The collection represents the history, culture, and ideals of our country. It is the mission of the Fine Arts Program to manage the portfolio of fine arts assets under GSA's stewardship to insure their location, accessibility, preservation, and appropriate use to enhance and promote superior workplaces for federal agencies and the public they serve.

Conservation

The profession devoted to the preservation of cultural property for the future. Conservation activities include examination, documentation, treatment, and preventive care, supported by research and education.

–The American Institute for the Conservation of Historic and Artistic Works (AIC)

Beginning in 1990, the Fine Arts Program initiated an agency-wide conservation program that identifies works of art that require conservation by inspecting artwork installed in each region every two years; developing a priority list of conservation projects based upon this inspection; implementing conservation projects through a National Conservation Contract; and assisting regions in the review, inspection, and acceptance of conservators and conservation work. Conservation is a two-step contracting process: (1) developing a professional condition assessment and treatment recommendation, and (2) performing treatment based upon the assessment and recommendations. The National Conservation Contract provides the mechanism for contracting conservation services on an agency-wide level. For the first time, qualified professional conservators are available to perform conservation projects for GSA. All principal conservators must be Professional Associates or Fellows of the American Institute for Conservation of Historic and Artistic Works (AIC). Three firms, each with a geographic team, have provided these services since 1997:

- **Paintings** Page Conservation, Inc., Washington, DC
- **Sculpture** McKay Lodge Fine Arts Conservation Laboratory, Inc., Oberlin, OH
- **Textiles** Art Conservation Associates, Boston, MA
- **Architectural Arts** Art Conservation Associates, Boston, MA

Cyclic maintenance

The periodic and routine maintenance of cultural property to insure its preservation.

The National Conservation Contract also includes the preparation of maintenance instructions and cyclic maintenance plans for individual works of art that have been conserved. The cyclic maintenance guidelines contained in this document are generic in nature and are meant to be applied as appropriate for those works of art that have not received specific conservation treatment. These guidelines are based upon the experiences of the conservators who worked under the National Conservation Contract to assist GSA personnel in the care and maintenance of the artwork under their control. They reflect not only general information on specific material types and installation environments, but also specific situations encountered within GSA. Each section relates to a specific artistic media and material, and is meant to be used alone or in combination with other sections to address each unique artwork installation found in GSA buildings.

This document will be revised and enhanced as a maintenance program for GSA's Fine Arts Collection is developed.

It is our goal to prolong the time required for conservation through an active maintenance program thereby reducing conservation costs and preserving GSA's Fine Arts Collection for future generations.

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Paintings

1.1 Introduction

This set of recommendations for the cyclic maintenance of paintings and murals was prepared as part of the professional services contract for art conservation. Under this contract, a number of paintings and murals were conserved within GSA's Fine Arts Collection. The intention of these recommendations is to enable GSA personnel to participate in the monitoring and care of artworks in their buildings.

GSA's painting and mural collection encompasses artistic works through the early 21st century, including the historically significant WPA period of 1933–43. Works by important American artists were commissioned to be hung and, in some cases, incorporated into the fabric of the buildings. GSA's painting and mural collection comprises a significant and permanent part of our collective historic heritage.

Art conservation is the field of professionals who are trained to restore artwork and to understand art materials, causes of deterioration, and the environment required to preserve optimal artwork condition over time. It would be appropriate to consult with an art conservator through GSA's Fine Arts Program promptly if conditions within the GSA building setting appear to endanger the artwork by defacement, accident, water intrusion, excessive heat or light, and so on. Art conservators usually specialize in either paintings, paper artifacts, or objects.

1.2 The structure of easel paintings

Easel paintings are typically smaller than murals, painted in a studio, and then hung in a frame on the wall in a building. It is helpful to understand what a painting is made of when assessing its condition.

- **Support.** The support is the substrate upon which the paint is applied. Typically, this may be canvas tensioned over a wood framework known as a stretcher. Paintings may also be done on solid panel supports such as wood, Masonite, or artist's board. Increasingly, artists are working over unconventional supports. The support has a large effect on what sorts of conditions may seriously harm the painting. A paper support is usually considered the most delicate, requiring the artifact to be framed properly with archival, non-acidic materials touching the paper support.

- **Ground layer or priming.** Most traditional paintings utilize a ground layer or priming as an isolating and sealing layer between the absorbent support and the paint layer. Some modern paintings do not utilize a ground layer allowing paint to stain into the support on purpose. Traditional grounds are either oil or water-based (glue and whiting). Contemporary works often use a more flexible acrylic ground or priming. Knowledge of the presence of a ground layer or priming will help one understand the appearance of the painting and possibly identify why a painting may be experiencing one sort of problem or another.

- **Paint medium.** The paint medium is the binder that holds the paint together. Watercolor is a

delicate, transparent paint medium utilizing a gum base on a paper support and is usually treated with separate framing and conservation considerations. Gouache, distemper, and tempera are all terms for more opaque, water-soluble, glue-based paints. The term "tempera" also may encompass true egg tempera in which the binder is egg yolk and the work is characterized by short, careful brushstrokes. Casein is a more durable water-based paint in which the traditional medium was milk. Most traditional water-based media are characterized by a matte finish.

Acrylic paints are water-based and utilize a polymer binder. They dry to an even satin sheen and are mildly water-resistant when dry. They came into wide usage in the 1960s. Oil paints utilize the most durable binder, which is a drying oil such as linseed. It can be very difficult to differentiate between the appearance of some acrylic and oil paints. Oils usually show a difference in gloss in some areas. Oils are sometimes applied over acrylics.

- **Varnish.** A varnish is a coating applied to saturate the different colors on a painting, unify gloss, and provide a measure of protection from atmospheric pollutants. Traditional oil paintings are usually varnished. Paintings done in water-based media are generally not varnished. Most varnishes yellow as they age and, if chosen properly, will remain soluble over time. Varnishes are meant to be removed and replaced every 50 to 100 years. The choice of a varnish and its application or removal are serious work requiring a professional conservator.

1.3
The structure of murals

A mural is a large painting generally painted for a specific location in a building. A mural may have been painted *in situ* or executed in the artist's studio and then installed at the site.

- **Support.** Some murals are simply very large easel paintings executed on canvas over a wooden stretcher. With their large size, one may encounter potential problems such as loose canvases that change in tension as humidity fluctuates and develop planar distortion. Most canvas murals are, however, painted and then intentionally attached to the wall. Many of the canvas murals through

Literature, Poetry, Science and Art attributed to Henry Meixner
Old Erie Public Library, United States Courthouse, Erie, PA
McKay Lodge Fine Arts Conservation Laboratory, Inc.

Left: During conservation

Right: During conservation, detail

the WPA era and up to the mid-1960's were marouflaged, i.e., attached directly to plaster walls with an adhesive composed of white lead in oil or oil/varnish. These adhesives are tenacious, insoluble, and hazardous if mishandled. Removal and remounting of a mural adhered with white lead in oil is a serious and expensive undertaking. Murals may also have been mounted with glue, paste, or commercial wallcovering adhesives.

Murals may also be painted directly upon a wall in either exterior or interior settings. Exterior supports include cement stucco, brick, block, and false wall systems. Interior supports include all of these as well as traditional lime plaster and drywall. Knowledge of the wall substrate is important in understanding condition and causes of deterioration.

- **Ground layer or priming.** As with easel paintings, a mural may or may not have a ground or priming. (See section 1.2, "Ground layer or priming.")

- **Paint medium.** Murals have been executed in all the media identified above for easel paintings. If painted directly on plaster, the wall may be smoothly burnished or coarse and textural. In the U.S., most murals executed directly on a wall are done over dry plaster, cement, or block, and this may be referred to as a *secco* fresco. The medium may be either oil or water based. These murals are sometimes prone to separation or flaking of the paint film from the substrate. Murals executed in the rarer, traditional Italian manner of true *buon* fresco imply that pigments were applied to a smooth, wet lime stucco support, area by area. Traditional *buon* fresco can be extremely lovely and durable and GSA is fortunate enough to have fine examples of this medium.

1.4 Environment

GSA painted artworks are primarily set in the interiors of their buildings. In such settings, the agency can influence the appreciation of the artwork and its longevity with choices that are made about the environment. Many factors make up the interior environment. It is appropriate for artwork caretakers to assess the existing environment of the installed artwork as well as to consider the setting into which they will install future artwork.

- **Temperature.** The normal office temperature range likely to be encountered in a federal building will probably be acceptable to the artwork. One exception would be the loss of heat in winter through equipment breakdown or construction/renovation. Paintings should not be allowed to experience freezing conditions as this promotes cracking.

  Temperature is one of the two factors that determine relative humidity. Air with the same moisture content will have a higher relative humidity when it is chilled and a lower relative humidity when it is heated. Changing the thermostat setting changes the relative humidity unless water is removed or added to the system.

- **Relative humidity.** Relative humidity (RH) is a description of the moisture present in the air at a given temperature. It is expressed as a percentage of the total moisture the air can carry at that temperature. Relative humidity has a major effect on the materials used in paintings. Most materials in artwork absorb moisture and will seek an equilibrium moisture content with the air around them. This induces dimensional expansion and contraction of the various materials that make up the artwork. This movement occurs at different rates and magnitudes characteristic of the materials. This exercising of the materials leads to cracking, warping, flaking paint, and so on. Some paintings are more susceptible to serious problems than others, owing to their original materials and construction, **but excessive or unnecessary RH changes are deleterious to all paintings. In addition, mold growth is promoted by RH levels above approximately 70 percent.**

  Relative humidity may be monitored in a space by several methods. Sling pychrometers are much more accurate than simple readout dials and should be used occasionally to check other RH instruments. There are many battery-powered, LED-readout instruments for RH and temperature that often have internal recording of highest RH and temperature even after they are reset. Museums in the past have used highly accurate recording hygrothermographs, which record data with a pen onto a chart on a rotating drum. They require a windup and paper change periodically but are highly accurate and provide a record over time. Data loggers are often used now to record conditions and require downloading onto a computer disc.

  GSA should consider RH and temperature monitoring for questionable spaces that are being considered for artwork installation or spaces that in the past have proved problematic. **We suggest GSA aggressively monitor RH in any space where mold has been observed; the objective is to constantly stay below approximately 70 percent RH.** Monitoring RH and temperature can also determine whether heating or cooling systems are functioning well. **In the winter, we generally would like to see abnormally low RH readings (below 20 percent) avoided. At any time, but especially summer, we would like to see no more than 70 percent RH in an interior space with artwork.**

- **Lighting.** **Excessive levels of light and/or a high percentage of ultraviolet within the light will actively degrade the condition and appearance of the artwork.** Pigments, paint media, supports, and varnishes can all be compromised. Depending on the materials, fading, embrittlement, browning, and so on may occur. Paintings executed in watercolor and other media on paper are considered the most susceptible, generally requiring supplemental glazing protection in framing. (See section 1.5) In oil paintings and frescoes, the media and supports are more durable, but certain pigments remain subject to fading from light. As the light-fastness of any painting cannot be assumed, it is prudent to limit overall levels and UV content for all painted artwork.

  GSA should seek to position paintings that are moveable in places that do not receive direct sunlight or are illuminated by fluorescent lights that are very high in UV content. If this is not

Untitled by Alex Katz
Silvio V. Mollo Federal Building
New York, NY
Page Conservation, Inc.

Left: Before conservation: Note environmental damage caused by spray cleaning of display case and hair oil due to chairs in front of mural, as well as visual disruption.

Right: After conservation: Note removal of chairs and cases, and addition of protective railing and interpretive plaque at left.

possible, sunlight may be controlled conventionally with drapes or shades. Tinted glazing known as neutral density filtering can reduce UV levels. **UV filtration is clear and may be incorporated in window glazing.** Fluorescent fixtures may be controlled in several ways. **Bulbs with built-in UV filtration are available, as are clear UV-filtering sleeves to go over conventional bulbs.** Alternatively, it is sometimes **easier to fit UV-filtering Plexiglas over the lens of the fixture.**

As it is not possible to gauge the amount of UV in a light source without manufacturer's data or instrumentation, it may be appropriate to consult a museum lighting professional to determine overall levels and UV content and to advise as to lighting changes, if needed. Modern museum-standard lighting for artwork does not contain UV. Generally, lights attached to the tops of frames should be removed and discarded.

- **Traffic.** **We have observed numerous paintings that are in danger in GSA buildings because of poor placement in the path of heavy foot traffic or cleaning and trash carts.** Paintings and murals at lower heights are particularly vulnerable. Also, the changing of security requirements have required redesign of entry lobbies with potential impact on pre-existing artwork. If paintings and murals are showing scratches or scuff marks, it may be appropriate to consider either repositioning the artwork or adding some sort of barrier device. There are many sorts of barriers that have been utilized in federal buildings. Some of the more successful types have been steel railings mounted low on the wall to allow the floors to be cleaned. In one building, the marble shoe molding was extended outward to prevent mail carts from striking the murals. The best solution, however, is to place artwork where it may be observed without being crowded by people or service personnel.

- **Heating and cooling systems.** Often the environment in a federal building will be conducive to artwork longevity. The buildings are heated and cooled to comfortable levels and often have excellent thermal retention because of their mass. However, personnel must be aware of several situations to avoid with artwork. Each space with artwork needs to be examined as to where the

HVAC outlets are located. **Artwork should not be placed near incoming or return duct outlets.** The local environment can be rendered poor by an incoming blast of hot or cool air. Return ducts tend to constantly draw dust-laden air across a painting. **With murals mounted directly on walls, one must also ascertain that HVAC ductwork does not run behind or above the mural in the wall as the ducts can sweat and dampen the wall. Radiators can desiccate the artwork and provide a constant updraft of dust-laden air. They should not have artwork hung over them.**

A separate issue from duct and outlet placement is excessive cycling of heating and cooling systems in federal buildings. In an effort to save energy and reduce costs, heating and cooling systems are often cut back aggressively in the evenings and on weekends. This can cause excessive fluctuation in temperature and humidity levels. Changes in humidity induce differential movement in the materials that make up paintings and promote flaking paint. By inducing movement unnecessarily often, the cycling of heating and cooling systems hastens structural instability in paintings. We recommend moderating the range of the allowable daily temperature and humidity fluctuation in areas where artwork is placed. In cases where artwork has been noted as experiencing flaking problems, a constant environment should be maintained daily.

- **Water intrusion.** Ideally, one would like to position artwork to minimize the chances of catastrophic water damage. Questions should be asked before artwork is installed, such as: Where are plumbing, water lines, and HVAC ductwork in relation to the artwork? Installing a mural that cannot be easily moved, e.g., underneath a bathroom location, is a poor idea. Less obvious system questions to ask include whether the artwork is near a roof seam or internal gutter, an environmentally uncontrolled pipe chase in the wall, steam heat pipes, and so on.

1.5 Framing and hanging

Presumably, most commissioned artwork for a federal building will come preframed. Often, however, frames are damaged or need to be upgraded for better appearance. If a frame looks damaged, a frame conservator or competent frame shop should be able to determine whether the frame is worth having conserved or simply replaced. Please note that there is a lot of WPA-era (1933–1943) artwork in federal buildings that have plain frames that are historic and should be conserved.

Paper artifacts such as watercolors, prints, and drawings have special framing requirements. The major concerns are that the original paper support should be housed with an all-rag, acid-free window mat on the front and an equal quality mat on the reverse, that the artifact, especially a pastel, is not touching the glazing, and that the glazing is either UV-filtering Plexiglas or UV-filtering glass. Plexiglas is more shatter-resistant and weighs less for large pieces but scratches easily if not cleaned properly and may not be used over pastels because of static attraction of the pastel pigments. Conservation glass with UV filtration is perhaps better for small- to modest-sized pieces in a controlled setting and for all pastels.

The frames attached around murals should not require much action from GSA personnel except to **avoid adhering masking tape to the frames.**

In general, we suggest that frames not be touched by cleaning personnel. Most frames are toned and/or created with water-sensitive finishes that are easily disturbed by wiping with a cloth or by overenthusiastic cleaning of the glazing. **(Note—Plexiglas requires a specially formulated cleaning solution and a soft, clean cloth, preferably cheesecloth, to wipe with.)** If possible, white gloves should be worn when handling gilded frames. Masking tape and self-adhesive labels should never be applied to the decorated surface of a frame.

The choice of where to hang paintings is discussed in various sections of **1.4 Environment**, above. Paintings and frames of small to modest size (such as up to 30 inches x 36 inches) may be safely hung from one wire strung across the reverse of the picture between two-thirds and three-fourths of the way up. Attachment of the wire to the back of the frame is best made with mirror hangers (straps with D-hooks) screwed into the back of the frame. Screw eyes are acceptable only on small paintings. Larger or wide paintings are best hung with two wire loops, one at each side on the reverse. Other arrangements including anti-theft hardware are available; consult a framer. Very large paintings and murals require professional installation with proper brackets.

Anchors into the wall may be placed in several different ways. Nail-in anchors with two or three nails accommodate fairly heavy paintings if the plaster or drywall is sound. Large or heavy paintings or paintings anchored to masonry walls require the setting of plastic sleeves into pre-drilled holes. The screw is driven into the anchor most of the way, leaving 1/8" of the shank to catch the wire.

Fome-Cor is a white backing material (one-quarter inch thick), which should be attached to the back of all paintings on stretchers not otherwise covered. This is for dust and puncture protection. The back of the canvas does not need to “breathe”.

1.6 Handling and storage

The specifications below are of a general nature. Handling and storage of works of art in GSA’s Fine Arts Collection should be coordinated through GSA’s Fine Arts Program. The Fine Arts Program maintains the Fine Arts Storage Facility and coordinates professional art transport for the collection.

Significant and unnecessary damage can be incurred in handling and storage. In terms of handling, paintings are carried face-in to the carrier. Use white gloves if the frame is gilded. Do not lift a painting up until you are sure where you are carrying it, the path is clear, and there is

City of Cleveland Welcomes the Arts by William Hicok Low
Howard M. Metzenbaum U.S. Courthouse,
Cleveland, OH
McKay Lodge Fine Arts Conservation Laboratory, Inc.

Left and Right: Protecting a mural with a plywood "box" during building renovation.

something soft such as padded carpet blocks on which to sit it at your destination. When transporting a painting in a vehicle, place it upright if possible, making sure seat padding is not pushing the back of the canvas. Secure the painting to keep it from sliding.

Paintings are normally wrapped in clear polyethylene plastic sheeting prior to travel. Mylar tape is commonly used over the polyethylene. Bubble pack or corner padding is also placed over the polyethylene. One can strap the painting corner to corner over the bubble pack or cover padding with Mylar tape. Bubble pack and all other packing materials should not press on the face of an unglazed painting. With heat or pressure, packing materials can stick to or indent varnish layers on a painting. Large size cardboard or Fome-Cor is useful to make either a protective U-shaped sheath or "sandwich" around the wrapped frame and painting.

The safest place for artwork is hung on the wall. However, this is not always possible. Offices move, walls are painted, spaces are renovated, and so on. In a federal building, we suggest utilizing a small locked room as a temporary storage area for artwork. The room must be dry, not contain water or steam pipes, have basic ventilation and a normal environment. For a small number of pieces, elaborate storage racks are not required. Very small paintings may be placed with a dust cover horizontally face-up on shelves. Moderate to large paintings may be stood face up on the side of the frame on some sort of padding such as carpet or carpet blocks as long as the frame does not have elaborate protruding ornaments. Clean cardboard or Fome-Cor may be used to interleaf between each vertical painting. It is customary to remove all hooks and wires from paintings that are placed in storage as these items tend to damage other adjacent stacked artwork.

There are professional companies that do nothing but wrap, crate, transport, and store artwork. They should be engaged to handle either large numbers of pieces or oversize paintings. Receipts for artwork being moved or loaned are normally required. A logbook of work going in and out of a storeroom is also practical.

1.7
Yearly inspection

The specifications below are of a general nature. The inspection of artwork, determination of conservation needs, and the National Conservation Contract are managed through the Fine Arts Program.

It is appropriate for all the artwork in a federal building to be inspected in a formal manner at least biennially. Ideally, there would be an inventory of all artwork in a building and a curatorial or registrar file on each piece gathered in one location. A standard inspection form utilized on a regional or national level should be completed yearly. It is hoped that a user-friendly inspection form coupled with some preface materials, such as this report, would allow an observant nonprofessional to execute a useful inspection. It is hoped these forms would be reviewed by the curatorial staff.

There are several conditions that, if observed, require prompt attention, and some sort of mechanism for action must be in place. Acute conditions include:

- Fire or smoke damage.
- Water either directly hitting the artifact or simply nearby.
- Mold development or recurring high relative humidity.
- Defacement.
- Flaking, tears, broken pieces, losses, etc. to either the painting or frame.
- Faulty hangers, wires, or wall anchors.
- Pending construction or renovation including interior painting.

1.8
Cyclic maintenance and protection

In the interior of a federal building, it is not appropriate to have service personnel touching artwork, paints, frames, and murals. **There does not need to be routine dusting, vacuuming, wiping, or polishing of paintings or frames as this almost always will lead to over cleaning, excess wear and damage.** We suggest that if excessive dust, paint drips, or dirty glazing are observed, personnel should contact the building manager who will then contact the regional fine arts officer. The regional officer will be in a better position to either locate an appropriate conservator, a good framer or, if the situation is truly not serious, direct some other in-house action.

We favor scheduled cyclic maintenance of paintings, frames, and murals being undertaken on a longer cycle, such as once every five years, by a qualified conservator on a building-wide basis. In most cities, a call to the local museum should provide a reference to a local private conservator who should be asked to walk around the building and provide a work plan and estimate for light, remedial removal of surface dust and grime from paintings and murals. This could be expanded as the needs are identified to include:

- Cleaning of glazing on frames.
- Replacement of faulty wires, hangers, etc.
- Retouching of minor nicks or scratches to paintings and frames.
- Removal of paint drips.

Periodically, buildings are painted and more extensively renovated. In the case of portable artwork, pieces should be removed and placed in storage during wall repair and painting. Exceptionally large pieces, including murals, have to be protected *in situ*. Care and time must be taken in the protection of murals with clean polyethylene sheeting prior to painting:

1. Before any dust is created, cut a piece of clean, clear polyethylene to a size larger than the mural.
2. If a mural has a conventional frame, drape the polyethylene over the mural frame and tuck it in behind. Tighten the corners with tape bonded to the polyethylene.
3. If a mural has only a minimal architectural molding frame or no frame at all, tape the polyethylene to the flat wall 3–4" outside of the frame or mural with blue 3M painters tape, which is formulated to release more cleanly than masking tape. (Note—A conservator should be consulted if a mural is to be covered for more than a few weeks or in conditions of high humidity.)
4. Perform all wall repair that creates dust and repaint surfaces.
5. Remove tape and polyethylene by folding the dusty side into itself to keep dust from migrating onto mural.
6. If polyethylene was taped to the wall, have a very skilled painter carefully paint in the wall up to the edge of the frame or mural. If the paint drips onto the frame or mural, a conservator should be called.

In cases where serious renovation or construction work is to be done, an artwork protection plan must be developed in the construction planning phase. It is not responsible custodial care of federal artwork to assume that a general construction contractor can or will protect the artwork. The artwork protection plan for renovation/construction must include:

1. A transport and removal plan for all artwork not attached to the walls.
2. A protection enclosure design incorporating filtered, active ventilation, if needed in the opinion of a conservator.
3. Review of proposed protection enclosure materials and installation procedures.
4. Documentation, including photographic, of condition of artwork prior to erection of artwork protection enclosures.
5. Inspection and acceptance of installed protection enclosure prior to start of construction.
6. Monitoring of artwork condition during construction. Minimum of one on-site inspection per month.
7. Emergency action plan to quickly notify GSA and a qualified conservator in the event of fire, water intrusion, freezing conditions, heavy vibration, and so on.
8. Post-construction survey of artwork condition, including photo documentation.

Sculpture

2.1
Introduction

This document describes cyclic maintenance procedures for common types of sculpture. Cyclic maintenance consists of actions by untrained or semi-trained staff—often building maintenance personnel—that should be performed *repeatedly* and can be safely performed *repeatedly* to prolong good appearance and physical condition. The work is generally cost-effective and can delay the need for more costly specialized attention or involved procedures. Sculpture in most collections has not often received regular maintenance, so the effects of these well-meaning measures on the sculpture need to be evaluated after several years by a conservator. The best maintenance may be to do nothing at all. Never allow overzealous, misguided or erroneous work to be performed.

Only the most common problems, those that need to be addressed several times a year or at least once a year, are presented. All other problems must be individually addressed by conservators or collections managers.

The cyclic maintenance instructions presented in this document are purposely designed to be succinct as well as safe to perform for those with limited training or no training at all. Where procedures do call for some minimal training, these are so identified. The instructions are formatted in a way that makes them suitable for use in a maintenance procedures database or as hand-outs for maintenance personnel.

All those performing maintenance should have a supervisor assigned and available to assure, through follow-up inspection, that the maintenance was performed and that no damage has occurred as well as to be available to answer questions. The supervisor should have contact with a collections manager or other preservation authority to get questions from maintenance personnel answered correctly and promptly. Maintenance personnel should be encouraged to ask questions.

A maintenance record sheet, much like a washroom maintenance sheet, should be created as both a record and a reminder. These also clearly establish the tasks as formally assigned so they are not considered a casual undertaking.

2.2
Four maintenance principles for all cases

The following four principles apply to the maintenance of all sculpture in all situations:

1. **Watch for unusual situations.** Be alert for situations out of the ordinary and seek advice before acting. Because sculpture could be made from a variety of art, industrial or other materials, there could be as many specialized maintenance needs. Clearly, an encyclopedia of art materials, forms of deterioration, and maintenance needs is not appropriate for this form of quickly accessed maintenance instructions. Therefore, when a condition or situation is encountered that is not addressed here, the maintenance personnel must seek advice from a superior or available conservator.

2. **Use common sense.** Do not perform any recommended maintenance action presented here if your common sense tells you it may be harmful or if you are unsure about an effect. You may be encountering a special situation and your common sense could be correct. Abide by your common sense and seek advice from a supervisor.

3. **Proceed gradually.** Proceed with caution, always in a gradual manner and perform small initial tests of maintenance materials and procedures.

4. **Observe conditions before working.** Look over the sculpture before proceeding and record observations. Recording condition information is an important part of maintenance. Observations recorded should be on paper and placed in the file for the artwork as a permanent record.

2.3
Weathering steel
Outdoors

Understanding:

The following advice applies when a sculpture is composed totally or partially of weathering steel. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Corten is one brand of weathering steel and the word is often used to identify all weathering steels. Almost all weathering steel sculpture is placed outdoors. Weathering steel is usually left uncoated to purposely corrode. While the corrosion generally looks like rust, weathering steel can often be identified by a purple color in some of its corrosion. Generally, it is a darker color than the corrosion on mild steel. The corrosion should be thin, hard, and tightly bonded when mature and stable. When left exposed to air, the corrosion, which looks like rust, actually builds to a protective layer that prevents further corrosion. When this protective layer is disturbed, by scrapes for example, the corrosion process will begin again and "heal" itself. Removal of some forms of graffiti from weathering steel may require the thinning or other disturbance of this protective corrosion. If so, the film will develop again, though it may take two years for it to match the oldest film. However, this disruption of the stable corrosion is to be avoided. When the weathering steel is constantly exposed to moisture, such as near the ground, in shade, or where water puddles, the corrosion activity may not cease but continue in a metal-depleting process that is more aggressive than the rust on common steel. Weathering steel constructions that form hollow containers often have holes drilled to allow condensed moisture to escape. These holes, if present, should be kept open. Also, salts used for ice control lead to damaging corrosion processes. Salting of sidewalks should be kept as far from weathering steel as possible. Weathering steel is sometimes painted. Paint can hold moisture in place against the steel and create the damaging corrosive environment just mentioned. Painted weathering steel must be inspected carefully for this condition and must always be completely coated. The following problems and maintenance actions are the only ones that can safely be performed by those with no specific training.

Force One: Consciousness is Crucial by John Paul Rietta
Richard H. Poff Federal Building
Roanoke, VA
McKay Lodge Fine Arts
Conservation Laboratory, Inc.

Left: Before conservation: Note the evidence of loose, flaky corrosion called "pack out" due to poor drainage and moisture.

Right: During conservation: Note how the sculpture is elevated to allow airflow.

Cyclic actions:

Soiling. Hose off accumulated dust, bird droppings, salts from ice control, and other materials. Rain alone does not do this effectively. Soils and invisible contaminants can be damaging. Only if there is physical weakness, such as from broken welds, is it not safe to direct a stream of hose water on a weathering steel sculpture. Forceful sprays of water using a jet nozzle are otherwise safe and desired. Use the force of the water to remove thick accumulations in pockets where rain does not reach. Rinse thoroughly from top to bottom. This washing can be every week if necessary but should be at least once a year. Frequency depends on rate of soiling accumulation. Washing more frequently than the average frequency of rain storms in the area where the sculpture is located may not be desirable. However, during a dry summer, keep up the washing as the average annual frequency of rain storms may be once every two to three weeks. Observed soiling should largely drive the frequency of washing. A general rule calls for rinsing sculpture whenever the plaza is washed down with a hose.

Graffiti. Paint and pen graffiti, oil stains, and tar deposits are difficult to remove completely from weathering steel because these media often penetrate into the corrosion layer. It is important, however, to try to remove as much as possible, as some graffiti seems to attract more. Restrict your removal method to cloths and solvents. Use knit fabric cloth instead of woven or terry cloth as coarse corrosion will collect fibers. Solvents available from hardware stores that would be effective include acetone and methyl ethyl ketone (MEK). Solvents will also dilute graffiti paint, causing it to penetrate deeper into some corrosion. This is unavoidable. In time these stains tend to diminish. Thick applications of paint can be removed using any of the solvent-based commercial paint strippers. Peel-Away 1, available from Sherwin Williams paint dealers, is a nonsolvent paint remover that can be used and is very effective. It has a very high pH (alkaline) as it is made from sodium hydroxide. Follow the package directions. This is safe to use on the steel but do not follow with the recommended acid wash. Instead, rinse the steel thoroughly with a hose after completing the procedure.

Drainage. If weep holes for drainage exist at the lower parts of forms, clear them of clogging by inserting a wire or stick into the holes. Report any clogged weep holes that can not be cleared.

Do not:

- Do not wash with a pressure washer.
- Do not sand, brush, or abrade the protective corrosion on the steel unless directed to do so by a supervisor for a particular problem. Do not clean with any product other than the solvents and paint strippers mentioned or with plain water. Do not apply any coating whatsoever.
- Do not use Prosoco maintenance products (1) without clearing their use with a supervisor, (2) without testing, and (3) without prior experience in the use of the product. Prosoco products are often very effective but can damage materials not specifically within their range of application.

Assume that sculpture, because it is art, falls outside the range of application even though it may be made from the same materials the Prosoco product was meant to treat.

- Scratched graffiti should just be left alone to gradually form a new protective corrosion layer. Do not sand or abrade to blend in the scratches without permission from a supervisor.

Watch for:

Look for loose, flaky corrosion (called "pack-out"). This damaging corrosion is a sign of continued moisture. There may be a remedy for this condition. Report evidence of this to the supervisor.

Refer to "Four maintenance principles for all cases," section 2.2

Weathering steel

Indoors

Understanding:

(See *Weathering Steel—Outdoors* for more information).

The following advice applies when a sculpture is composed totally or partially of weathering steel. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Artists choose weathering steel for outdoor installations because of the stability of its surface corrosion. However, some of these sculptures have been moved to indoor exhibits after they have naturally developed the stable corrosion film that actually protects the steel from further corrosion. Great care must be taken to protect this stable corrosion as it can only form again in an outdoor environment. It cannot be artificially created except by imitation with colorants and these are not a good substitute for the real thing.

Cyclic actions:

Soiling. Dust with soft brushes only or a soft bristle vacuum attachment.

Graffiti. Graffiti removal from a sculpture indoors is not expected to be a part of cyclic maintenance as it can be with outdoor sculpture. However, procedures using solvents to remove marks described under *Weathering Steel—Outdoors* are safe to perform indoors if there is adequate ventilation. Use knit fabric cloth instead of woven or terry cloth as coarse corrosion will collect fibers. Solvents may leave stains when used locally on weathering steel kept indoors. It may be necessary to apply them overall for an even effect. The overall look of the sculpture may change (darkening is likely) due to residual effects of solvent penetration into the corrosion but the change, if even overall, would not be considered detrimental as the surface of a weathering steel object is natural.

Do not:

- Do not use water or paint removers that need water for rinsing. The use of water may activate the corrosion locally, leading to a visual deviation where applied that may take many years to diminish.

- Do not sand, brush, or abrade the protective corrosion on the steel unless directed to do so by a supervisor for a particular problem. Do not clean with any product other than the solvents mentioned. Do not apply any coating whatsoever.

Watch for:
There is not likely to be deterioration indoors to watch for.

Refer to "Four maintenance principles for all cases," section 2.2

2.4
Bare mild steel
Outdoors

Understanding:
The following advice applies when a sculpture is composed totally or partially of bare mild steel. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Some sculpture has been created with low carbon or "mild" steel—the common industrial grade of steel and often in the form of reused industrial objects. In nearly all cases, the artist purposely allows a rusted surface. However, there are cases where artists applied an oil coating after creating the sculpture in an attempt to stabilize the corrosion. In most of these cases, the oil is ineffectual but has left a degraded, darkened or peeling film. Whether there are the remains of a former coating does not alter the maintenance recommendations below.

Cyclic actions:
Soiling. Hose off accumulated dirt, bird droppings, salts from ice control, and other materials. Only if there is physical weakness—such as from broken welds—is it not safe to direct a stream of hose water on a steel sculpture. Forceful sprays of water are otherwise safe and desired. Use the force of the water to remove thick accumulations in pockets. This washing can be done every month if necessary but should be at least once a year. Frequency depends on rate of soiling accumulation. Washing more frequently than the frequency of rain storms in the area where the sculpture is located is not desirable. Observed soiling should solely drive the frequency of washing.

Graffiti. Paint and pen graffiti are difficult to remove completely from rusted steel because these media often penetrate into the corrosion layer. It is important, however, to try to remove as much as possible as some graffiti seems to attract more. Restrict your removal method to cloths and solvents. Use knit fabric cloth instead of woven or terry cloth as corrosion will collect fibers. Solvents available from hardware stores that would be effective include acetone and methyl ethyl ketone (MEK). Solvents will also dilute the paint, causing it to penetrate deeper into some corrosion. This is unavoidable. In time these stains tend to diminish. Thick applications of paint can be removed using commercial paint strippers. Peel-Away 1, available from Sherwin Williams paint dealers, is a nonsolvent paint remover that is very effective. It has a very high pH (alkaline) as it is made from sodium hydroxide. Follow the package directions. This is safe to use on the

steel but do not follow with the recommended acid wash. Instead, rinse the steel thoroughly with a hose after completing the procedure. It is expected that rubbing with a solvent-soaked cloth will remove loose corrosion and this is acceptable in the higher priority of removing graffiti.

Drainage. If weep holes exist at the lower parts of forms, clear them of clogging by inserting a wire or stick into the holes. Report any clogged weep holes that cannot be cleared.

Do not:

- Do not wash with a pressure washer.
- Do not sand, brush, or abrade the protective corrosion on the steel unless directed to do so by a supervisor for a particular problem. Do not clean with any product other than the solvents and paint strippers mentioned or with water.
- Scratched graffiti should just be left alone to gradually form new corrosion. Do not sand or abrade to blend in the scratches without permission from a supervisor.
- Do not use Prosoco maintenance products (1) without clearing their use with a supervisor, (2) without testing, and (3) without significant experience in the use of the product. Prosoco products are often very effective but can damage materials not specifically within their range of application. Assume that art falls outside the range of application even though it may be made from the same materials the Prosoco product was meant to treat.

Watch for:

Look for loose, flaky corrosion (called "pack-out"), especially at the joins between pieces of steel. This damaging corrosion is a sign of continued moisture, and there may be a remedy for it. Report evidence of this to the supervisor.

Refer to "Four maintenance principles for all cases," section 2.2

Bare mild steel

Indoors

Understanding:

The following advice applies when a sculpture is composed totally or partially of bare mild steel. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Some sculpture has been created with low carbon or "mild" steel—the common industrial grade of steel and often in the form of reused industrial objects. Such sculpture is normally exhibited outdoors but some are indoors. In nearly all cases, the artist purposely allows a rusted surface. However, there are cases where artists applied an oil coating after creating the sculpture in an attempt to stabilize the corrosion. In most of these cases, the oil is ineffectual but has left a degraded, darkened or peeling film. Whether there are the remains of a former coating or not does not alter the maintenance recommendations below.

Soiling. Dust with soft brushes only or a soft bristle vacuum attachment.

Graffiti. Graffiti removal from a sculpture indoors is not expected to be a part of cyclic maintenance as it can be with outdoor sculpture. However, procedures using solvents, not water, to remove marks described under *Bare mild steel—outdoors* are safe to perform indoors allowing for the need for ventilation. Use knit fabric cloth instead of woven or terry cloth as coarse corrosion will collect fibers. Solvents may leave stains when used locally on corroded steel kept indoors. It may be necessary to apply them overall for an even effect. The overall look of the sculpture may change (darkening is likely) due to residual effects of solvent penetration into the corrosion but the change, if even overall, would not be considered detrimental as the surface of a corroded steel object is natural.

Do not:

- Do not use water or paint removers that need water for rinsing. The use of water may activate the corrosion locally leading to a visual deviation where applied that may take many years to diminish.
- Do not sand, brush, or abrade the corrosion on the steel unless directed to do so by a supervisor for a particular problem. Do not clean with any product other than the solvents mentioned. Do not apply any coating whatsoever.

Watch for:

There is not likely to be deterioration indoors to watch for.

Refer to "Four maintenance principles for all cases," section 2.2

2.5
Bare aluminum
Outdoors

Understanding:
The following advice applies when a sculpture is composed totally or partially of bare aluminum. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Aluminum forms a stable white or light gray corrosion outdoors, which is usually a thin powdery film. The thin, powdery white corrosion should be left untouched. A different type of corrosion forms small pits in aluminum. Both are normal, and the pitting corrosion is usually not problematic. However, damaging corrosion can, in rare instances, corrode aluminum into a weak, expanded and flaky sheet, especially near ground contact or in salt environments.

Cyclic actions:
Soiling. Hose off accumulated dirt, bird droppings, salts from ice control, and other materials. Only if there is physical weakness, such as broken welds, is it not safe to direct a stream of hose water on an aluminum sculpture. Forceful sprays of water are otherwise safe and desired. Use the force of the water to remove thick accumulations of dirt in pockets. This washing can be every month if necessary but should be done at least once a year. Frequency depends on rate of soiling accumulation.

Graffiti. Paint and pen graffiti are difficult to remove completely from aluminum because even mild rubbing with a cloth will remove the stable white aluminum oxide and can polish the metal. It is important, however, to try to remove as much as possible as some graffiti seems to attract more. Restrict your removal method to cloths and solvents, using a very gentle touch. Stop if the aluminum begins to discolor or gloss. Allow the solvents, strippers, and the rinse solvents or water to perform nearly all the work. Solvents available from hardware stores that would be effective include acetone and methyl ethyl ketone (MEK).

Drainage. If weep holes for drainage exist at the lower parts of forms, clear them of clogging by carefully inserting a wire or stick into the holes. Report any clogged weep holes that can not be cleared.

Do not:
- Do not wash with a pressure washer.
- Do not use commercial aluminum cleaners.
- Do not use nonsolvent paint strippers.

Refer to “Four maintenance principles for all cases,” section 2.2

Bare aluminum

Indoors

Understanding:

The following advice applies when a sculpture is composed totally or partially of bare aluminum. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Aluminum forms a stable white or light gray corrosion outdoors which is usually a thin powdery film. The thin, powdery white corrosion should be left untouched. A different type of corrosion forms pits in aluminum. Both are normal, and the pitting corrosion is usually not problematic. Aluminum indoors usually develops no condition problems; however, dust accumulations and graffiti may require cyclic maintenance attention.

Cyclic actions:

Soiling. Dust with soft brushes only or a soft-bristle vacuum attachment. For greasy marks, follow solvent treatments described under "Graffiti" below.

Graffiti. Paint and pen graffiti are difficult to remove completely from aluminum because even mild rubbing with a cloth will remove the stable white aluminum oxide and can polish the metal. It is important, however, to try to remove as much as possible, as some graffiti seems to attract more. Restrict your removal method to cloths and solvents, using a very gentle touch. Stop if the aluminum begins to discolor or gloss. Allow the solvents, strippers and the rinse solvents or water to perform nearly all the work. Solvents available from hardware stores that would be effective include acetone and methyl ethyl ketone (MEK).

Do not:

- Do not use commercial aluminum cleaners.
- Do not use nonsolvent paint strippers.

Refer to "Four maintenance principles for all cases," section 2.2

Majesty of Justice by Carl Paul Jennewein
U.S. Department of Justice
Washington, DC
Norton Art Conservation, Inc.

Left and Right: During conservation: showing details of cleaning with a cotton swab.

2.6
Stainless steel
Outdoors

Understanding:
The following advice applies when a sculpture is composed totally or partially of stainless steel. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Stainless steel is generally problem-free outdoors, but art made from stainless steel will accumulate dirt and marks, and sometimes graffiti, which call for cyclic attention. Be aware that small rust like spots or general orange stains of corrosion do form on stainless steel. Do not attempt to remove this corrosion as it is not a problem. There are various finishes to stainless steel that call for some specialized, periodic attention such as polishing and mild abrasive cleaning. Report concerns about deteriorated original finishes but do not attempt to restore a finish without instructions specific to the sculpture.

Cyclic actions:
Soiling. Hose off accumulated dust, bird droppings, salts from ice control, and other materials. Rain alone does not do this effectively. Only if there is physical weakness, such as broken welds, is it not safe to direct a stream of hose water on a steel sculpture. Forceful sprays of water using a jet nozzle are otherwise safe and desired. Use the force of the water to remove thick accumulations in pockets where rain does not reach. Rinse thoroughly from top to bottom. This washing can be performed weekly if necessary but should be done at least once a year. Frequency depends on rate of soiling accumulation, but washing cannot be overdone. A general rule calls for rinsing sculpture whenever the plaza is washed down with a hose.

Graffiti. Paint and pen graffiti, oil stains, and tar deposits can be removed from stainless steel, but aggressive rubbing during the removal process must be avoided so as not to burnish the metal. It is important, however, to try to remove as much as possible as some graffiti seems to attract more. Restrict your removal method to cloths and solvents. Solvents available from hardware stores that would be effective include acetone and methyl ethyl ketone (MEK). Thick applications of paint can be removed using any of the solvent-based commercial paint strippers. Peel-Away 1 available from Sherwin Williams paint dealers is a nonsolvent paint remover that can be used and is very effective. It has a very high pH (alkaline) as it is made from sodium hydroxide. Follow the package directions. This is safe to use on the steel but do not follow with the recommended acid wash. Instead, rinse the steel very thoroughly with a hose after completing the procedure.

Drainage. If weep holes for drainage exist at the lower parts of forms, clear them of clogging by carefully inserting a wire or stick into the holes. Report any clogged weep holes that cannot be cleared.

Do not:
- Do not wash with a pressure washer.
- Do not clean with any product other than the solvents and paint strippers mentioned or with

plain water. Do not apply any coating whatsoever.

- Do not use Prosoco maintenance products (1) without clearing their use with a supervisor, (2) without testing, and (3) without prior experience in the use of the product. Prosoco products are often very effective but can damage materials not specifically within their range of application. Assume that art falls outside the range of application even though it may be made from the same materials the Prosoco product was meant to treat.
- Scratched graffiti requires the attention of a sculpture conservator. Do not sand or abrade to blend in the scratches without permission from a supervisor.

Refer to "Four maintenance principles for all cases," section 2.2

Stainless steel

Indoors

Understanding:

The following advice applies when a sculpture is composed totally or partially of stainless steel. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Stainless steel is generally problem-free outdoors and should have no problems at all indoors, but art made from stainless steel will accumulate dirt and marks, and sometimes graffiti, which call for cyclic attention. Be aware that small rust like spots or general orange stains of corrosion do form on stainless steel. Do not attempt to remove this corrosion as it is not a problem. There are various finishes to stainless steel that call for some specialized, periodic attention such as polishing and mild abrasive cleaning. Report concerns about deteriorated original finishes but do not attempt to restore a finish without instructions specific to the sculpture.

Cyclic actions:

Soiling. Periodically vacuum or wet-wipe away accumulated dust. It is safe to use detergents, even all-purpose household cleaners, to remove grime. Always use cleaning agents sparingly and apply to the cloth or paper towel. Do not spray directly on the sculpture.

Graffiti. Paint and pen graffiti, oil stains, and tar deposits can be removed from stainless steel, but aggressive rubbing during removal process must be avoided so as not to burnish the metal. It is important, however, to try to remove as much as possible since some graffiti seems to attract more. Restrict your removal method to cloths and solvents. Solvents available from hardware stores that would be effective include acetone and methyl ethyl ketone (MEK). Thick applications of paint can be removed using any of the solvent-based commercial paint strippers.

Do not:

- Do not clean with any product other than the solvents mentioned or with plain water. Do not apply any coating whatsoever.

- Do not use Prosoco maintenance products without (1) clearing their use with a supervisor, (2) without testing, and (3) without prior experience in the use of the product. Prosoco products are often very effective but can damage materials not specifically within their range of application. Assume that art falls outside the range of application even though made from the same materials the Prosoco product was meant to treat.
- Scratched graffiti requires the attention of a sculpture conservator. Do not sand or abrade to blend in the scratches without permission from a supervisor.

Refer to "Four maintenance principles for all cases," section 2.2

2.7
Painted metals
Outdoors

Understanding:
The following advice applies when a sculpture is composed totally or partially of painted metals. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Most painted sculpture meant for outdoors is made from steel, aluminum, or sometimes weathering steel. Although there are several possible types of coatings used, general cyclic maintenance procedures can be offered for all. Differences in coatings are significant when solvents are needed to remove graffiti. Only a very few coatings can withstand solvents. Thus, only trained conservation personnel should attempt to remove graffiti.

Cyclic actions:
Soiling. Hose off accumulated dust, bird droppings, salts from ice control, and other materials. Rain alone does not do this effectively. Only if there is physical weakness, such as broken welds, is it not safe to direct a stream of hose water on a painted metal sculpture. Forceful sprays of water using a jet nozzle are otherwise safe and desired. Use the force of the water to remove thick accumulations in pockets where rain does not reach. Rinse thoroughly from top to bottom. This washing can be performed weekly if necessary but should be done at least once a year. Frequency depends on rate of soiling accumulation, but washing cannot be overdone. A general rule calls for rinsing sculpture whenever the plaza is washed down with a hose.

Graffiti. Paint and pen graffiti, oil stains, and tar deposits can only sometimes be removed from painted metal as the necessary solvents usually dull the paint coatings. Do not attempt to remove graffiti. Report graffiti so that trained conservation personnel can perform this work. It is almost always safe to use mineral spirits and naphtha to remove some materials. Test these solvents in an inconspicuous place first.

Coating damages. It is very important to inspect for coating loss that exposes steel. Losses over aluminum may be ignored or treated as if for steel, but do not use rust converters on aluminum. For other metals, if the area of coating loss is small, apply a rust converter to any rust that has

On High by Alexander Liberman
Robert Giamo Federal Building & U.S. Courthouse New Haven, CT
Wilson Conservation, Inc.

Left: During conservation: Note "watch for unusual situations," such as the inappropriate use of the sculpture as trash receptacle by construction contractors. Insure that weep holes for drainage are clear.

Right: After conservation.

formed (many brands available in auto supply stores). After the rust converter is dry, apply alkyd paint in a similar color, keeping the new paint confined to the area of loss as much as possible. Rustoleum is a good choice as long as there is no risk of the public touching the repair, as this coating takes a long time to dry. This long drying time relates to its effectiveness in corrosion control. When these simple mends accumulate to the point of unsightly appearance, then recoating or overcoating is needed and a sculpture conservator must be consulted.

Drainage. If weep holes for drainage exist at the lower parts of forms, clear them of clogging by carefully inserting a wire or stick into the holes. Report any clogged weep holes that can not be cleared.

Do not:

- Do not wash with a pressure washer.
- Do not use graffiti-removal products.
- Do not use all-purpose household cleaners.
- Do not use Naval Jelly on corrosion.
- Do not use cleaning solvents other than mineral spirits or naphtha.
- Do not use Prosoco maintenance products (1) without clearing their use with a supervisor, (2) without testing, and (3) without prior experience in the use of the product. Prosoco products are often very effective but can damage materials not specifically within their range of application. Assume that art falls outside the range of application even though it may be made from the same materials the Prosoco product was meant to treat.

Watch for:
Corrosion that creeps under the coating and builds into a thick, flaky mass or forms between joins of metal. This type of corrosion quickly becomes severely damaging and requires professional attention. Watch also for blistering of the paint.

Refer to "Four maintenance principles for all cases," section 2.2

Painted metals / woods, etc.

Indoors

Understanding:
The following advice applies when a sculpture is composed totally or partially of painted metals/woods, etc. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Painted sculpture of different material meant for indoor display can have almost any kind of coating. Often, these coatings (usually paints) were chosen specifically by an artist for a certain appearance. Other times, any coating at hand was used, even if durability was not optimal. Some are sensitive to water, others to certain solvents; some can be easily burnished by rubbing; others are fragile and can flake off by touch. Complicating things further, minor appearances of age and deterioration are at times tolerated because remedying these conditions would require too drastic a change in materials or appearance. Hence, one must take great care not to do anything that may risk altering an unknown coating. For this reason, maintenance procedures for coated surfaces must be severely limited.

Cyclic actions:
Soiling. Remove dust with soft brushes only.

Graffiti. Contact a supervisor who will contact a conservator.

Coating damages. Contact a supervisor who will contact a conservator

Do not:
- Do not use a vacuum.
- Do not wash with water.
- Do not use graffiti removal products.
- Do not use all-purpose household cleaners.
- Do not use solvents.

Watch for:
Paint losses and report to supervisor.

Refer to "Four maintenance principles for all cases," section 2.2

2.8
Bronze and copper
Outdoors

Understanding:
The following advice applies when a sculpture is composed totally or partially of bronze or copper. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Sculpture made from bronze or copper may or may not have an original surface. Some artists desire a specific color of patina; others want the metal to corrode as it will. These matters do not always affect maintenance, which should strive to maintain the current appearance as long as possible or until the surface is corrected by a conservator. Wax is often used as a protective layer and this, once applied, must receive maintenance reapplications, usually each year. A simple training session should be undertaken before attempting to renew a wax coating. If this is not possible, an attempt can be made without training by following the instructions given below. However, if a bronze or copper sculpture shows no signs of having been given a previous application of wax, if the metal appears to be free of any old coating, then no maintenance coating should be applied until a conservator evaluates the sculpture and determines the intent of the artist. If there is no wax, then maintain that condition without wax. Some sculpture has been coated with a clear resin (Incralac). This coating may or may not have a wax coating on top. Whether there is wax or not, it is safe to apply wax for the first time over Incralac or to reapply wax to Incralac. If there appears to be a deteriorated coating in place, it is still safe to apply wax over this. Deteriorated Incralac is white or somewhat hazy and may be flaking or peeling from the bronze. Other previous coatings may be yellowish and peeling.

Cyclic actions:
Soiling. Hose off accumulated dust, bird droppings, salts from ice control, and other materials. Rain alone does not do this effectively and causes uneven streaking. Only if there is physical weakness, such as broken joints or if the sculpture is made from sheet copper, is it not safe to direct a stream of hose water on a bronze/copper sculpture. Forceful sprays of water using a jet nozzle are otherwise safe and desired. Use the force of the water to remove thick accumulations in pockets where rain does not reach. Wet cloths or sponges may be used to wash off stubborn bird droppings but take care not to rub through a coating or remove green or black patina. Rinse thoroughly from top to bottom. This washing can be performed weekly if necessary but should be done at least once a year. Frequency depends on rate of soiling accumulation, but washing can not be overdone. A general rule calls for rinsing sculpture whenever the plaza is washed down with a hose. Always perform such a thorough washing before a wax maintenance renewal.

Coating maintenance. It is very important to thoroughly wash a bronze/copper sculpture as described above before renewing a wax coating. Renew a wax coating at least once a year with additional paste wax. In some situations, a sculpture can go for two or more years without waxing, but this cannot be predicted beforehand. Hence, once a year is a schedule that suits all bronze/copper sculpture. However, if a bronze or copper sculpture shows no signs of having been

given a previous application of wax or if the metal appears to be free of any old coating, then no wax coating should be applied until a conservator evaluates the sculpture and determines the intent of the artist. For previously coated or waxed bronze/copper sculpture, apply Butchers White Diamond clear paste wax in a manner similar to waxing a car. Order White Diamond Clear paste wax by telephone from Shields Packaging (509-949-0900). They will fax to you a mail-order form with current prices. It may also be available at hardware stores. Apply sparingly from the can to the bronze using natural bristle brushes with the metal ferrule taped over to prevent banging the bronze, working the wax into the surface, spreading out excess, and allowing it to dry. Heavily textured surfaces will require extra diligence to thin out wax deposits in crevices. A traditional, soft shoe-shine brush is an excellent tool for buffing the surface and is still easy to find. Otherwise, buff-up lightly with soft cotton cloths.

Graffiti. Only in cases where it is known for certain that no clear resin Incralac coatings are present can a safe attempt at removing graffiti be regularly attempted. If Incralac is present, solvents will greatly alter the appearance of the sculpture through dissolving this material. Wax coatings, on the other hand, can withstand careful and limited removal with solvents in an attempt at removing graffiti and then the wax can be easily replaced following the procedures for wax maintenance renewal as described above. Solvents such as mineral spirits and naphtha will affect the wax more than acetone and methyl ethyl ketone (MEK). Attempt the removal of paint graffiti with acetone and methyl ethyl ketone first using solvent soaked cloths. If a residue remains, use naphtha or mineral spirits to slightly dissolve the wax coating that is under the graffiti. Restore the wax coating after graffiti removal following the procedures for wax maintenance renewal described above.

Do not:

- Do not use Brasso, Ajax, or any other commercial cleaning product.
- Do not use graffiti-removal products.
- Do not use solvents to remove graffiti if a clear coating such as Incralac is known to exist on the bronze/copper sculpture.
- Do not apply any protective coatings other than renewal applications of the specified wax.

Refer to "Four maintenance principles for all cases," section 2.2

Bronze and copper

Indoors

Understanding:

The following advice applies when a sculpture is composed totally or partially of bronze or copper. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Unlike bronze/copper sculpture outdoors, sculptures made of bronze, brass, or copper protected in an indoor environment usually retain a desirable or original finish that must not be altered or damaged in any way. In contrast, outdoor sculpture made from bronze or copper may or may not have an original surface. Some artists desire a specific color of patina that would be likely to change with exposure outdoors; others want the metal to corrode as it will. Indoor sculpture usually retains the desired patina. Because the patina or finish on indoor bronze, brass, or copper sculpture is likely not protected with a clear coating or wax and is the desired appearance, no cyclical cleaning or mark-removal work should be done except by sculpture conservators.

Cyclic actions:

Soiling. Periodic removal of dust can be done by careful brushing with a soft brush as needed—not likely to be more often than once a year.

Graffiti. Graffiti and marks must be attended to by a sculpture conservator.

Refer to "Four maintenance principles for all cases," section 2.2

2.9

Stone sculpture and bases

Outdoors

Understanding:

The following advice applies when a sculpture or base is composed totally or partially of stone. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Stone used in sculpture outdoors is usually limestone, granite, and sometimes marble. Stone sculpture accumulates dirt, bird droppings, sometimes lichens or other biological growths, and can harbor nests. Repeated washings help to keep stone clean and prevent stains from becoming permanent. Rain is not a substitute for washing as it repeatedly washes only some areas leaving others dry; this results in an uneven appearance over time. Rain is also usually acidic so freshwater rinsing is beneficial to help neutralize the stone surface. Stone sculptures sometimes have mortar joints near or on their bases. These joints are damaged by biological growths such as lichen, so joints must also be kept clean.

Cyclic actions:

Soiling. Hose off accumulated dust, bird droppings, nests, salts from ice control, and other accumulated materials. Rain alone does not do this effectively. Soils and invisible contaminants can be damaging. Forceful sprays of water using a jet nozzle are safe and desired. Use the force of the water to remove thick accumulations in pockets where rain does not reach. Rinse thoroughly from top to bottom. This washing can be done every month if necessary but should be performed at least once a year. Frequency depends on rate of soiling accumulation. A general rule calls for rinsing sculpture whenever the plaza is washed down with a hose.

Joints. Some joints between stone may be mortared or may be caulked. Whenever mortar or caulk loosens, remove the loose material. When there is a loss of mortar or caulk, do not refill without getting the advice of a sculpture conservator. In some situations, it is better to leave the joint open rather than improperly fill the loss.

Graffiti. Paint and pen graffiti, oil stains, and tar deposits are difficult or impossible to remove completely from stone. Attempting to dissolve paint and other materials with solvents dilutes the material and allows it to soak into the stone. Therefore, do not attempt to remove graffiti from stone without first consulting with a sculpture conservator.

Do not:

- Do not wash stone with a pressure washer.
- Do not scrub stone.
- Do not use any coatings on stone.
- Do not use Prosoco maintenance products without (1) clearing their use with a supervisor, (2) without testing, and (3) without prior experience in the use of the product. Prosoco products are often very effective but can damage materials not specifically within their range of application. Assume that sculpture, because it is art, falls outside the range of application even though made

from the same materials the Prosoco product was meant to treat.

- Scratched graffiti should have the attention of a sculpture conservator. Do not sand or abrade to blend in the scratches without permission from a supervisor.

Watch for:

Loose parts of stone sculpture.

Refer to "Four maintenance principles for all cases," section 2.2

Stone

Indoors

Understanding:

The following advice applies when a sculpture is composed totally or partially of stone. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Stone indoors is generally subject to dust accumulations, small graffiti, and stains from hands or spilled liquids. Only dust removal can safely be performed on a cyclical basis by nonconservators.

Cyclic actions:

Soiling. Dust only with a soft brush as often as needed. The frequency is likely to be once a year.

Graffiti. Paint and pen graffiti, liquid stains, oil stains, and tar deposits are extremely difficult to remove from stone. Consult a sculpture conservator.

Do not:

- Do not wash stone with water or any other liquid.
- Do not scrub stone.
- Do not use any coatings on stone.
- Do not use Prosoco maintenance products without (1) clearing their use with a supervisor, (2) without testing, and (3) without prior experience in the use of the product. Prosoco products are often very effective but can damage materials not specifically within their range of application. Assume that sculpture, because it is art, falls outside the range of application even though made from the same materials the Prosoco product was meant to treat.
- Scratched graffiti should just be left alone to gradually form a new protective corrosion layer. Do not sand or abrade to blend in the scratches without permission from a supervisor.

Refer to "Four maintenance principles for all cases," section 2.2

2.10

Wood
Outdoors

Understanding:
The following advice applies when a sculpture is composed totally or partially of wood. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Because wood used in sculpture for outdoor exposure may or may not be coated, and if coated (including paint) the coating materials may vary, it is not possible to recommend protective coating maintenance for all sculptures. However, wood that has been coated should have that coating maintained, often annually, and therefore, maintenance for wood outdoors will differ for each case.

Cyclic actions:
Remove trash, dirt, leaves, and other accumulations from wood by brushing or use of a vacuum, especially where these materials accumulate out of sight as they trap and hold moisture.

Do not:
- Do not wash wood with water or solvents unless directed to do so by a sculpture conservator.
- Do not apply any coatings unless directed to do so by a sculpture conservator or conservation-directed maintenance instruction.

Watch for:
Biological deterioration of wood and report any instances promptly.
Boring by insects and report any instances promptly.

Refer to "Four maintenance principles for all cases," section 2.2

Wood
Indoors

Understanding:
The following advice applies when a sculpture is composed totally or partially of wood. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. Because wood used in sculpture for indoor exposure may or may not be coated, and if coated (including paint) the coating materials may vary, it is not possible to recommend protective coating maintenance for all sculptures.

Cyclic actions:
Soiling. Dust only with a soft brush as often as needed. The frequency is likely to be once a year.

Graffiti. Paint and pen graffiti, liquid stains, oil stains, and tar deposits are extremely difficult to remove from wood. Consult a sculpture conservator.

Do not:

- Do not wash wood with water or solvents unless directed to do so by a sculpture conservator.
- Do not apply any coatings unless directed to do so by a sculpture conservator or conservation-directed maintenance instruction.

Refer to "Four maintenance principles for all cases," section 2.2

2.11
Ceramics and glass
Outdoors

Understanding:
The following advice applies when a sculpture is composed totally or partially of ceramics or glass. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. This class of sculpture materials includes glass in any form and glazed ceramics or tiles. These materials are usually durable to water and solvents and cleaning periodically is likely to be the extent of necessary cyclic maintenance. Be mindful of nonceramic or nonglass materials used nearby or on the ceramic or glass.

Cyclic actions:
Soiling. Hose off accumulated dust, bird droppings, salts from ice control, and other materials. Rain alone does not do this effectively. Only if there is physical weakness such as loose tiles or cracked or broken glass is it not safe to direct a stream of hose water on a sculpture. Forceful sprays of water using a jet nozzle are otherwise safe and desired. Use the force of the water to remove thick accumulations in pockets where rain does not reach. Rinse thoroughly from top to bottom. This washing can be performed every week if necessary but should be done at least once a year. Frequency depends on rate of soiling accumulation, but washing can not be overdone. A general rule calls for rinsing sculpture whenever the plaza is washed down with a hose. Sponges and cloths may be used to loosen soils. A detergent may safely be used and commercial glass cleaners may be used. Do not use tile or tub cleaners meant for household films as these do not occur on sculpture outdoors and these cleaners sometimes contain abrasives. Use only water unless absolutely necessary. Biological growths on tile grouts can be killed and discolored with household chlorine bleach diluted one cup per gallon of water and applied repeatedly, then rinsed with clear water.

Graffiti. Paint and pen graffiti, oil stains, and tar deposits can often be removed from glass and ceramics as the solvents needed for this in most situations do not affect these materials. It is almost always safe to use mineral spirits and naphtha to remove some materials and acetone or methyl ethyl ketone (MEK) for removing paints. Commercial paint strippers may also be safely used. Test these solvents in an inconspicuous place first.

Grouts. Loose grout should be reported and promptly repaired by a skilled tile contractor or sculpture conservator.

Do not:
- Do not wash with a pressure washer.
- Do not use Prosoco maintenance products without (1) clearing their use with a supervisor, (2) without testing, and (3) without prior experience in the use of the product. Prosoco products are

often very effective but can damage materials not specifically within their range of application. Assume that sculpture, because it is art, falls outside the range of application even though made from the same materials the Prosoco product was meant to treat.

Refer to "Four maintenance principles for all cases," section 2.2

Ceramics and glass

Indoors

Understanding:

The following advice applies when a sculpture is composed totally or partially of ceramics or glass. When it is a part of a sculpture, the particular restrictions and advice for adjacent or nearby materials must be considered as well. This class of sculpture materials includes glass in any form and glazed ceramics or tiles. These materials are usually durable to water and solvents. In an indoor environment maintenance cleaning is not likely to be needed often. Be mindful of nonceramic or nonglass materials used nearby or on the ceramic or glass. Glass and ceramic materials intended for indoor exhibit may be complex and contain sensitive components such as paints, dyes, and other materials.

Cyclic actions:

Soiling. Remove dust periodically by soft brush or dry wiping with a soft cloth. Stubborn dirt or marks such as finger marks may safely be removed with a glass cleaner. Never spray a cleaner or water directly on the object. Spray onto a soft cleaning cloth.

Graffiti. Sculpture made from glass and ceramics for indoor exhibit may have sensitivities and material complications that make the use of solvents unsafe. Always consult a sculpture conservator for the removal of marks that do not respond to water and glass cleaners.

Grouts. Loose grout should be reported and promptly repaired by a skilled tile contractor or sculpture conservator.

Do not:

- Do not wash with a pressure washer.
- Do not use Prosoco maintenance products without (1) clearing their use with a supervisor, (2) without testing, and (3) without prior experience in the use of the product. Prosoco products are often very effective but can damage materials not specifically within their range of application. Assume that sculpture, because it is art, falls outside the range of application even though made from the same materials the Prosoco product was meant to treat.

Refer to "Four maintenance principles for all cases," section 2.2

Textiles

3.1
Introduction

The textile collection of GSA is primarily made up of contemporary works commissioned or purchased through the Art in Architecture Program from the 1970s to the present. Though the pieces vary widely in materials, size, types of display methods, display environment, and storage facilities, they will all benefit from the following maintenance procedures.

Preventive conservation procedures help to ensure a well-maintained and stable collection. A large and important part of the care procedure is observation and maintenance on a regular annual schedule. The procedures, however seemingly simple or routine, can go a long way toward maintaining a stable collection, whether on display or in storage, and hopefully mitigate the need for a full conservation treatment.

The accompanying Textile Maintenance Questionnaire 3.10 and GSA Art Inspection Form should be used together each time the textiles are examined. They should be filed and studied to observe condition or environmental changes. If changes occur, notify a textile conservator. (Note—artwork in GSA's Fine Arts Collection is inspected biennially.)

3.2
Nature of textile materials

Textiles are a complex and varied medium. The artworks are often fragile, multimedia pieces that incorporate mixed fibers and structural techniques to create two- or three-dimensional works. The manufacturing of a fiber into a textile has five components: (1) the fiber, whose material may come from many sources, ranging from plant-based materials such as cotton, linen, hemp, and jute; animal-based materials such as silk, wool, fur, leather, and feathers; and manmade fibers such as rayon, nylon, polyester, and acrylic; (2) the yarn, whose structure is made by spinning or twisting the fibers together; (3) the fabric construction, which is either woven, twisted, looped, knotted, or a combination; (4) the finish, with processes such as desizing, mercerization, shearing, heat setting, or bleaching; and (5) the color, which may be dyed, printed, or painted.

Cloud Series by Lenore Tawney
John F. Shea Federal Building
Santa Rosa, CA
Art Conservation Associates

Left: During conservation: Note conservator securing hanging fibers to protect them during vacuuming.

Right: During conservation: note conservator reinforcing the attachment of fibers to the top of the textile.

3.3 Maintenance and care requirements

The aim of cyclic maintenance is to provide stability and long-term care for the collection. Its procedures include watching for changes and monitoring the textile, its display environment, and the storage area; keeping the textile and its environment clean; recording and maintaining annual condition reports; and notifying a textile conservator with any changes. The changes may at times seem small, irrelevant, or not important or crucial to the condition of the artwork, but textiles are fragile artworks. Their sensitivity to environment, their installation, and their material strength are important to understand and to look at for their preservation. Seemingly ordinary tasks can provide needed maintenance.

3.4 Environment

The environment within which an artwork is displayed or stored plays a vital role in its condition. Textiles contain physical and chemical properties that cause them to deteriorate rapidly if exposed to fluctuations in temperature and humidity, if there is too much light, or if there are pollutants and particulates in the air such as dirt, dust, industrial and automobile pollution, food, off-gassing of materials and/or pests. Contact with skin can also be harmful. Salts and oils transfer to fibers and after a period of time can cause discoloration and weakening; therefore, a stable, well-monitored environment is required for the safety of the artwork.

Textiles, both on permanent display and in storage, should be examined on a regular schedule once a year.

Light

All textiles are sensitive to light, both invisible ultraviolet (UV) and visible radiation. Light causes a general weakening of fibers and structural deterioration, along with irreversible color fading. Once fading has occurred and is noticed, it is too late. The damage to the textile has been done and cannot be reversed. Even a white or colorless material that absorbs little visible radiation will absorb invisible UV causing damage. All organic material is at risk under light. The term “organic material” includes all things originating in animals or plants, i.e., cotton, linen, wool, silk, leather, feathers, etc., and because of similarities in chemical structure, also includes almost all synthetic dyes and plastics.

It is recommended for museums and collections that the light level be 50 lux. Though this level may not be practical for public buildings, it is important to keep the levels down as much as possible where textiles are displayed. The environment can be modified to lower the light level. Filters can be applied to windows to absorb daylight radiation. They are available as a self-adhesive film applied directly to the window, or as shutters, curtains, or sunblinds that allow light to filter in while filtering out UV. Fluorescent lights that also emit significant amounts of UV can be fitted with UV absorbing sleeves.

Light damage is cumulative, therefore, preventive measures should be taken to ensure appropriate light levels.

Watch for:

- Unnecessarily high light levels.
- Incandescent, tungsten, or fluorescent lights left on when the area is not is use and during the evening.
- Lights emitting heat near the textile.
- Direct daylight on the textile or continual indirect daylight.
- Perceptible color fading within the last six months.
- Blinds, curtains, or shutters that can be drawn to filter out the light.

If the light quantity seems to be a potential problem, it is recommended that a Blue Wool standard fading card be placed by the textile to estimate the amount of fading. These can be purchased through University Products, Holyoke, MA.

Humidity

The primary humidity scale in a display or storage area is the scale of relative humidity (RH). The RH is a measure of the percentage of moisture saturation in the air. A high RH is more damaging than a high temperature. Air at 50 percent RH, at whatever temperature, holds half the water it can. As long as the RH remains constant, natural materials that contain moisture such as textiles, paper, or wood, will neither appreciably expand nor contract. The absorption of moisture makes fibers swell and distort, and they may also change shape. When the moisture is removed from the air, the fibers become dry and less flexible. In damp conditions, the probability of fungal growth such as mold is high. This expansion and contraction causes the textile to become distorted and weakened. Therefore, it is imperative that there be as little RH change as possible, or at most, a slow gradual or seasonal increase and decrease. The humidity level should be kept between 50 and 65 percent.

In high-traffic public buildings where windows and doors are often open, it may be difficult to control the RH, even if the building is equipped with an HVAC system. If the RH becomes too high or too low, it maybe necessary to install a humidifier or a dehumidifier within the display or storage area. This will require monitoring under the supervision of a textile conservator.

RH is measured by a sling wet-and-dry bulb hygrometer, dial hygrometers, or a recording thermohydrograph, all of which need calibration by someone who is familiar with the equipment. Also available is an electronic hygrometer that can self-calibrate. The most practical, though the least accurate (but will give a good indication), is the humidity-indicating card. Humidity recording devices are available through University Products, Holyoke, MA.

Watch for:

- Any dampness on the textile, display wall, or storage area.
- A damp or very dry environment.

If the environment is excessively dry or humid, notify a textile conservator to install a humidifier or dehumidifier, and instruct responsible personnel in its use.

Air pollutants and particulates

There are two types of air pollutants: particulate and gaseous. Particulate matter, (i.e., dust and dirt) can attract moisture, insect pests, and acidic pollutant gases. It can also cause abrasion to fibers; therefore, it is important to remove this particulate matter to keep the textile and its surrounding environment clean. Gaseous air pollutants (i.e., from sulfur dioxide and ozone) are quite harmful but are hard to handle and remove without HVAC air-filtering systems. Stand-alone filtering units are available for small, contained areas but must be monitored and have their air filters changed frequently.

Watch for:

- Drafts from doors, windows, or air ducts.
- Dust, dirt, or food on the textile and in the environment.
- Open doors and windows. (If open, close them.)

The area around the textile should be kept clean and free of dust and dirt throughout the year.

3.5 Vacuuming

Annual vacuuming and dusting is a crucial part of the maintenance procedures. Dust and dirt can attract insect pests, moisture, and acidic pollution, and can be abrasive to the textile. Vacuuming must be done under the supervision of a textile conservator, either by a conservation technician or trained and supervised GSA personnel.

Group 11 - 1977 by
Ruthadell Anderson
Prince Kuhio Federal Building &
U.S. Courthouse, Honolulu, HI
Art Conservation Associates

Left and Right: During conservation: Note the conservators vacuuming textiles.

Equipment

- Vacuum cleaner: small, lightweight, variable suction, portable, over-the-shoulder cleaner, with flexible extension hose. This will allow both hands to be free and keep the cleaner away from the textile. This vacuum should be dedicated to cleaning textiles only.
- Nylon screening, with the sharp edges of the screening bound with tape: The screening is used to prevent the textile from being sucked into the nozzle of the vacuum cleaner, and it holds down any loose threads and protects fringes.
- Netting to secure over hose nozzle with tie or rubber band for vertically displayed textiles.
- Soft natural-bristle brush.

Vacuuming Procedure

Do not attempt to vacuum without instruction by a textile conservator.

1. If the textile is displayed vertically, cover the hose nozzle with the netting. If the textile is flat, place the screening on top.
2. Adjust the suction so that particles of debris lift from the surface without lifting the textile.
3. Work in the direction of the warp and weft, or pile.
4. Work on a small area at a time, methodically covering the area.
5. Glide the attachment lightly over the surface without pressing down or rubbing.
6. If needed, use a soft, natural-bristle brush to dislodge particles into the suction.
7. Watch for fragility, separations, beads, embroidery.
8. When finished, clean the screening, netting, and brush by washing thoroughly.

3.6 Pests

Insect pests are attracted to an environment for food, moisture, and temperature. Infestations often start with pests coming in through open windows and doors and on the bottoms of shoes. They lay eggs directly on the textile or dust, dirt, and debris in the area. Though there are a wide variety of pests, most of the destruction to textile materials is caused by carpet beetles and clothes moths.

Many of the beetle and moth pests are small, and their eggs and young larvae may be difficult to see. Visual inspection of the textile, environment, and storage area is necessary. If any active infestation is found, notify a conservator immediately.

Watch for:

- Live insects, silk webbing, casts skins of larvae.
- Clothes moths: Small, dull, gray-fawn moths that scuttle rather than fly. They hide in dark areas and lay batches of eggs on wool, silk, feathers, and skins. The larvae spin silk webbing, or spin a cocoon leaving a trail of “grazed” textile and frass.
- Carpet beetles: Damage is recognized by holes and “grazed” areas, which are irregular but clean cut. They have active, hairy torpedo-shaped larvae, lacking the silk webbing and mess of the moth

larvae damage. It is best to inspect for carpet beetles in June. Look on the textile, including in any folds or creases, and on the reverse side.

- In storage areas, look in the boxes and in dark or damp areas. Inspect the textiles carefully, especially material at risk such as wool, animal skins, feathers etc.

Any material found to show signs of active infestation must be isolated from other textiles on display or in storage.

If infestation is suspected, install sticky traps near the textile, display area and storage. A conservator should be consulted to identify the pest and determine appropriate treatment.

3.7 Handling

Textiles should be handled as little as possible. If handling is required:

- Clean white gloves should be worn to protect the textile.
- Never pick up an unsupported textile. Always use a board or rigid support to carry it horizontally on acid-free board, if available.
- To turn a textile over, sandwich it between two boards, then turn the boards over, and remove the top board to view the other side.
- If handling a large textile, roll it onto a large tube with textile face down, keeping the edges of the textile in alignment.
- To remove a large hanging textile from a vertical wall display, roll the textile onto a large tube starting at the bottom of the textile with the front side rolling out. Continue rolling up to the top keeping the edges in alignment. This will take at least two people and two ladders, one on either side of the textile.

3.8 Display

There are many display methods for textiles, depending on the size, material, and location of display. A textile maybe attached to a mount first and then the mount is attached to a wall. Or a textile may be hanging by Velcro from a sleeve or pole, or it may be in a sealed, environmentally sound display case.

Whatever the display method:

- Is the textile secure in its mounting or case, with no sagging, separations, splitting, or distortion?
- Are the hanging devices secure?
- Is the weight of the textile evenly distributed over the hanging device?
- Is the textile protected from pedestrian traffic, touching, or possible abrasion?
- Is the textile in a protected environment, away from drafts, open windows, and doors?
- Is the lighting appropriate? No daylight or excessive interior lighting. Turn off lights when area is not is use.
- Is the temperature and relative humidity at appropriate levels?

3.9
Storage

The specifications below are of a general nature. Handling and storage of works of art in GSA's Fine Arts Collection should be coordinated through the Fine Arts Program. The Fine Arts Program maintains the Fine Arts Storage Facility and coordinates professional art transport for the collection.

Textile storage should be located in a dark, clean, dry space that is well ventilated, away from water pipes, and has a constant relative humidity. It is best to have storage furniture of metal rather than wood. Storage areas can be a breeding ground for pests, so the area must be kept clean.

A textile conservator should train personnel on procedures in rolling textiles onto tubes and packing into boxes. He or she should also check storage furniture to ensure that it can properly accommodate boxed, rolled, or framed storage.

Equipment

- Acid-free storage boxes of various sizes.
- Acid-free paper for lining boxes or drawers, for padding out textiles in boxes, and for rolling around tubes.
- Rolling tubes, various lengths and dimensions.
- Unsized, washed muslin.
- Archival labels and tags.
- Wide cotton twill tape to attach tags.

Procedures:

1. Keep storage areas clean, dry, and free of dust and dirt.
2. Examine storage areas and textile boxes thoroughly once a year for dampness, pests, and mold. Pay particular attention to dark corners in the storage area and to folds in textiles.
3. It is best to store textiles flat, as single layers in boxes or drawers lined with acid-free tissue paper. If a textile is too large for a box in a flat position and cannot be rolled, it can be accordioned into a box padded with acid-free tissue paper. Make sure there are no sharp folds or creases.
4. Interleave each layer of textile with acid-free tissue.
5. Do not overfill boxes as textiles crush very easily.
6. Cover all rollers with acid-free tissue before use. The larger the dimensions of the object, the greater the diameter of the tube needs to be.
7. Roll textiles firmly, right side out in the direction of the warp threads, interleaving with acid-free tissue paper, and keeping the edges in alignment.
8. Never roll a textile right side in or it will crush.
9. Wrap the rolled textile in clean muslin sheeting to keep out dust and light. Leave enough muslin at the ends to secure ties.
10. Tie ends with twill tape. Do not tie on the textile and never use rope or string that can cut into the textile.

Appendix 1: Textile Maintenance Questionnaire

This form accompanies GSA Textile Cyclic Maintenance Instructions.
Fill out this questionnaire together with the GSA Art Inspection Form.

ID # Artist:

Title: Dimensions:

Materials:

Building #: Building Name:

Address:

Sub-Location:

Type of Artwork:

Please answer questions and make notations. Notify textile conservator with any changes.

Environment
Light: what to look for

1. Are the light levels kept as low as possible?
2. Are the incandescent, tungsten, or fluorescent lights turned off when the area is not is use and during the evening?
3. Are lights emitting heat near the textile? Look especially for tungsten lights.
4. Is there direct daylight on the textile, or is the room lit with continual indirect daylight?
5. Has there been any perceptible color fading within the last six months?
6. Are there blinds, curtains, or shutters that can be drawn to filter out the light?

Humidity: what to look for

1. Is there any dampness on the textile, display wall, or storage area?
2. Is the environment damp or very dry?
3. If environment is excessively dry or humid, has a textile conservator been notified to perform RH level monitoring?
4. If necessary, has a humidifier or dehumidifier been installed?

Air pollutants and particulates: what to look for

1. Is it drafty from doors, windows, or air ducts?
2. Is there dust, dirt, food on the textile and in the environment?
3. Are doors and windows kept closed as much as possible?
4. Is the area around the textile clean and free of dust and dirt throughout the year?

This form can be enlarged by photocopying it at 130% to fit on letter size paper.

Continued: Textile maintenance questionnaire

Pests: what to look for

1. Are there live insects, pellets of frass, silk webbing, cast skins of larvae?

2. Are there any clothes moths? (Clothes moths are small, dull, gray-fawn moths that scuttle rather than fly. They hide in dark areas and lay batches of eggs on wool, silk, feathers, skins. The larvae spin silk webbing or a cocoon leaving a trail of grazed textile and frass.)

3. Are there any carpet beetles.? It is best to inspect for carpet beetles in June. (They have active, hairy torpedo-shaped larvae. Look for holes and "grazed" areas that are irregular but clean cut, lacking the silk webbing and mess of the moth larvae damage.)

4. Have the folds, creases and the reverse side of the textile been inspected?

5. Have dark and damp areas of storage and the interior of boxes been inspected carefully, especially material at risk such as wool, animal skins, feathers etc.?

6. Has any material found to show signs of active infestation been isolated from other textiles on display or in storage?

7. If infestation is suspected, have sticky traps been installed near the textile, display area, and in storage?

Display

Whatever the display method:

1. Is the textile secure in its mounting or case, with no sagging, separations, splitting or distortions?

2. Are the hanging devices secure?

3. Is the weight of the textile evenly distributed over the hanging device?

4. Is the textile protected from pedestrian traffic, touching, or possible abrasion?

5. Is the textile in a protected environment, away from drafts, open windows and doors?

6. Is the lighting appropriate—no daylight, or excessive interior lighting? (Turn off lights when area is not is use.)

7. Is the temperature and relative humidity at appropriate levels?

This form can be enlarged by photocopying it at 130% to fit on letter size paper.

Appendix 2: Vacuuming procedure

Do not attempt to vacuum without instruction by a textile conservator.

1. If the textile is displayed vertically, cover the hose nozzle with the netting. If the textile is flat, place the screening on top.
2. Adjust the suction so that particles of debris lift from the surface without lifting the textile.
3. Work in the direction of the warp and weft, or pile.
4. Work on a small area at a time, methodically covering the area.
5. Glide the attachment lightly over the surface without pressing down or rubbing.
6. If needed, use a soft, natural bristle brush to dislodge particles into the suction.
7. Watch for fragility, separations, beads, and embroidery.
8. When finished, clean the screening, netting, and brush by washing thoroughly.

Appendix 3: Handling procedure

If handling is required:

1. Wear clean white gloves to protect the textile.
2. Never pick up an unsupported textile. Always use an acid-free board if possible or a rigid support to carry it horizontally.
3. To turn a textile over, sandwich it between two boards, then turn the boards over, and remove the top board to view the other side.
4. If handling a large textile, roll it onto a large tube with the textile face down, keeping the edges of the textile in alignment.
5. To remove a large hanging textile from a vertical wall display, roll the textile onto a large tube starting at the bottom of the textile with the front side rolling out. Continue rolling up to the top, keeping the edges in alignment. This will take at least two people and two ladders, one on either side of the textile.

Appendix 4: Storage Guidelines

The specifications below are of a general nature. Handling and storage of works of art in GSA's Fine Arts Collection should be coordinated through the Fine Arts Program. The Fine Arts Program maintains the Fine Arts Storage Facility and coordinates professional art transport for the collection.

Procedures to be carried out under the supervision of a textile conservator.

1. Keep storage areas clean, dry, and free of dirt and dust.
2. Examine storage areas and inside the textile boxes thoroughly once a year for dampness, pests and mold. Pay particular attention to dark corners in the storage area and to folds in textiles.
3. It is best to store textiles flat, as single layers in boxes or drawers lined with acid-free tissue paper. If a textile is too large for a box in a flat position and cannot be rolled, it can be accordioned into a box padded out with acid-free tissue paper. Make sure there are no sharp folds or creases.
4. Interleave each layer of textile with acid-free tissue.
5. Do not overfill boxes as textiles crush very easily.
6. Cover all rollers with acid-free tissue before use. The larger the dimensions of the object, the greater the diameter of the tube needs to be.
7. Roll textiles firmly, right side out in the direction of the warp threads, interleaving with acid-free tissue paper and keeping the edges in alignment.
8. Never roll a textile right side in or it will crush.
9. Wrap the rolled textile in clean muslin sheeting to keep out dust and light. Leave enough at ends to secure ties.
10. Tie ends with twill tape. Do not tie on the textile and never use rope or string that can cut into the textile.

This form can be enlarged by photocopying it at 130% to fit on letter size paper.

Architectural Arts

4.1
Introduction

Architectural arts encompass a wide range of object types, materials, functions, and contexts. Generally, they are crafted as embellishments that are integral to a building and may or may not serve a practical purpose. Usually, they are intended to contribute to its artistic or aesthetic interest while sometimes serving a function, such as stained-glass window. Architectural arts may be integral to or independent of a building and able to be removed from the site.

The significance of an architectural art within a building varies widely. The object may be emblematic, symbolic, or otherwise serve as a point of focus; or it may serve as architectural ornament of minor significance to the overall design and function, such as a light fixture.

Architectural arts may be made of a wide range of materials or combination of materials, including metals, woods, plasters, concrete, stone, paint and other finishes, paper, and synthetic materials, including composites and plastics. They may also be made of natural organic substances, such as earthen materials, like clay.

4.2
Site impact

Because architectural arts are usually integral to a building, their care requires the understanding of the architecture and the relationship of the object to the architecture. Specifically, it is important to understand the methods and materials of construction, to be familiar with the past and current conditions of these materials and materials relationships, and to be able to anticipate future impact from the architecture, such as settling of the structure. Failures to the building's structure or ornament should be identified in order to arrest the cause of deterioration and to anticipate future maintenance needs.

The location and details of construction surrounding the object affect its condition in specific ways. Architectural arts in interior and exterior environments respond differently. Similarly, objects in different physical relationships to the building respond differently. Works installed in an exterior space without shelter are affected by certain conditions, whereas those mounted in a climate-controlled interior space are affected by others. Faulty roofs, leaking downspouts, damp infiltration, ferrous corrosion of a reinforced concrete wall, and a host of other conditions can adversely impact works of art.

Although the condition of indoor objects may fluctuate, they are generally more stable than those outdoors. Outdoor objects are subjected to damage from the weather, human contact, animals, and impact from the landscape. People are often the cause of the most serious damage. They may use outdoor art as a vehicle for recreation, such as climbing, sitting, and skateboarding. They may also intentionally damage the object with graffiti or other types of destruction.

Surrounding landscape materials often damage an outdoor object. Shrubs or trees may be located near the object causing excessive moisture and microbiological growth, such as mold, moss, lichen, etc. Vines may grow on the artwork. Mud may splash on the object. Gravel located around an object may affect it as people inadvertently kick the gravel into the object.

The effect of animals on the object is considerable. Birds resting on an object result in the presence of guano. The object may become the favorite stop for dogs. Rodents may burrow and live near the object. Bees and hornets may build nests in the object.

Some of these conditions may be mitigated. Installation of clear nylon netting is sometimes appropriate to discourage the presence of birds. Pruning or removal of plants is effective for deterring microbiological growth.

Mitigating the damage from these sources and relationships requires the involvement of landscape specialists, architects, engineers, building contractors, and a conservator. If adequate barriers to the object have not been originally designed, it may be necessary to add an appropriate buffer zone or other type of deterrent. Interpretive signage is also recommended.

A note about neglect

Experience has revealed that neglect and vandalism beget more vandalism. Therefore, it is very important that the evidence of neglect and vandalism are quickly removed, even if it is not possible to consult a conservator. Graffiti should be immediately removed using weak solvent systems widely used for graffiti removal. Guano, animal nests, and debris should also be removed immediately by hosing down the object, not only because they are possibly damaging but also because, in degrading the object, it becomes more likely that additional damage will occur.

Justice by Leo Friedlander
Plaster Models for Estes Kefauver Federal Building, Nashville, TN
Art Conservation Associates

Left: During conservation: Note conservators fabricating backing and support for the back of the plaster bas relief.

Right: After conservation.

Environment

One of the most important considerations for buildings and objects are their climactic environment. It is generally considered that one of two conditions are most damaging: problems with relative humidity, and the presence of water and its byproducts.

Air pollution, particularly the presence of airborne salts and of sulfur dioxide, is also problematic. When combined with fluctuating environmental conditions and the presence of water, they promote deterioration.

Essential to the discussion of environment is relative humidity (RH)—the measure of the amount of water held in the air at a given temperature*. There are three different types of deterioration that are influenced by RH: (1) change in size and shape, (2) chemical reaction, and (3) biodeterioration. Particular architectural materials may be subject to these types of RH-related deterioration.

Each of the material types encountered in architectural arts will be briefly discussed below.

Objects in storage and transit

The specifications below are of a general nature. Handling and storage of works of art in GSA's Fine Arts Collection should be coordinated through the Fine Arts Program. The Fine Arts Program maintains the Fine Arts Storage Facility and coordinates professional art transport for the collection.

Works of art in storage are problematic because they are out of view and often in uncontrolled environments. In some cases, works in storage are also in closed cases or other environments that may create a microclimate in which air circulation is blocked.

When architectural arts are removed from their original site and placed in storage, it is important that the same site conditions be continued to the extent possible. Objects should be routinely examined in their crates or cases. They should be monitored for relative humidity, moisture, and pest infestation. The presence of salts, cracks, flaking, crumbling, or other alterations in color, shape, or texture should be noted.

Movement should be extremely careful. Experienced and recognized art handlers should conduct transport.

*RH = amount of water in a given quantity of air x 100. (100 is the maximum amount of water that the air can hold at that temperature.)

4.4 Maintenance and care requirements

The following section presents recommendations for conservation care of architectural arts. To make the information as specific as possible, this section is organized according to type of material. "Do's" and "Don't's" are listed for each type of material or object.

Because of the wide variety of materials included in architectural arts, this section considers each aspect of the care and maintenance program. Recommendations for other conditions of the objects as noted above should be included where appropriate.

4.5 Wood

Wood comprises the fibrous tissue of trees and shrubs. The influence of climate on wood is relatively complex and depends on many factors, including wood type, dimensions of the individual wood units, orientation of the cut, manner of construction, age, condition, and extent to which the wood is seasoned. The moisture content of wood ranges by environment, with a higher content in climates with higher ambient relative humidity. Eventually the moisture content reaches a balance with ambient conditions.

Moisture within wood adjusts to balance external conditions. As a result, wood is relatively less vulnerable to moisture than other materials. Thin wood, such as wood veneer, however, has little ability to adjust to changing environmental conditions and can easily suffer from ambient drying and resulting warping. Extremely dry conditions and extreme fluctuation between wet and dry conditions are particularly dangerous for wood.

Relative humidity

- Maintain consistent relative humidity within the range of 55 to 65 percent. If relative humidity falls below this level, adjust the RH by lowering the heat, adding humidity with humidifiers, or both.
- Avoid conditions that cause extreme fluctuations, such as extreme lowering of RH during the day and raising at night by adjustments in heat or air conditioning. Fluctuations in relative humidity occurring over longer periods of time, such as seasonal fluctuations, are less damaging than daily or weekly fluctuations. Frequent fluctuations accelerate deterioration by promoting warping, detachment, and extreme drying.
- Avoid high humidity as it promotes insect infestation.
- Do not place an object over a heat vent, in the direct path of sun, or near a source of heat, such as a halogen lamp. If such placement is unavoidable, take protective measures. For sunlight, place UV filters over the window. For heat, redirect the heat away from the object. For lamps, relocate the lamp.
- Note changes in size or shape, indications of biodeterioration, or evidence of chemical reaction.

Light

- Filter direct light and heat on fragile wood objects.
- Avoid direct light on painted wood objects.

Pests

Wood deteriorates because of insect infestation, such as termites. Indications of insect infestation are apparent from boring holes, loss of strength, powdery residue, etc.

- Routinely check for insect infestation. Note powdery residue, presence of holes, and a hollow sound when tapped.
- Note presence of rodents or birds. Look for guano.

Care and handling

- Dust with dry, soft cotton cloths without cleaners, oils, or waxes.
- Examine on annual schedule. Note buckling, warping, insects, etc.
- Monitor climate on annual schedule. Monitor relative humidity with read-out hygrometers. Calibrate hygrometers at least four times a year. Retain records. Notify GSA of severe fluctuations.
- Do not oil, wax, or use proprietary materials of any sort.
- Remove or repair immediately, if vandalism occurs.
- Install interpretive signage

Handling and storage

- If a wood object is moved, it should be properly packed and padded. It is important that its environment is not radically changed to an extremely dry or very damp environment.
- If a wood object is stored over a long period of time, the climate in the crate should be monitored.
- Gloves should be worn while moving the object.
- If the object is moved, employ professional art handlers to handle the object.

4.6 Plasters

Plaster refers to the material made by mixing a dry powder with water and letting the mass set by drying, carbonation, or hydration. Plasters may be used to cover surfaces, such as walls or buildings, molds, or casts. They may also be sculpted. Plaster architectural arts include three dimensional sculptures, cast ornaments, and bas-reliefs.

State Pride by Leo Friedlander
Plaster Models for Estes Kefauver Federal Building, Nashville, TN
Art Conservation Associates

Left: Before conservation.

Right: After conservation.

Plaster of Paris

Plaster of Paris is a fine, hard, white plaster composed of hemihydrated calcium sulfate produced by heating gypsum at high temperatures. Plaster of Paris is known for its rapid setting properties and, when used as a mold or cast, its ability to render detail. It is soluble in acids and only slightly soluble in water.

Plaster of Paris may be affected by sustained exposure to water. While water slowly dissolves it, dry conditions do not appreciably change or damage the material. Relative humidity fluctuations may precipitate the migration of soluble salts, contributing to its breakdown. If plaster contains salt impurities, they may migrate and form efflorescence on the surface.

The interaction between Plaster of Paris and incompatible materials may be quite damaging. Because Plaster of Paris has no elasticity, the movement of attached materials may transfer to the plaster, causing damage. Without the addition of buffers or movement joints, thermal expansion of attached metal, for example, may cause severe cracking or other damage to the plaster. Likewise, wood attached to plaster may expand or bend with relative humidity fluctuations, shifting its movement to the brittle plaster and causing cracking.

Materials integrated into plaster that are incompatible may adversely affect the plaster. For example, metal corrosion and its subsequent enlargement through formation of salts may cause the breakdown of the plaster.

Lime plaster

Many historic finishes are composed of lime plasters. They include interior and exterior lime renders as well as lime-painted washes. Lime plasters are selected because of their durability, long working time, and ability to integrate pigment into their surface, thereby making them permanent, (i.e., fresco). Lime is calcium oxide. It is prepared by heating calcium carbonate derived from chalk or limestone and then adding water to the altered calcium oxide (slaking).

Lime plaster is usually augmented with a binder such as sand, marble powder, hair, or straw, which helps to control shrinkage and subsequent cracking.

Like Plaster of Paris, the interaction between lime plaster and incompatible materials may be harmful to the object. Differences in thermal expansion and deterioration of other materials embedded or in contact with the plaster can cause damage to the plaster.

Portland Cement is made from hydraulic cement obtained from a mixture of lime and clay. It is very hard. Portland Cement and other hydraulic cements are commonly used in modern construction. Uses include exterior rendering, pointing and bedding mortar, cast architectural ornament, as well as poured and reinforced units used for building construction.

Hydraulic cements resist deterioration better than lime plasters. When weaker and more porous materials, such as lime plaster or brick, is in contact with a cement as strong as Portland cement, the weaker materials often deteriorate because moisture and salts are forced to move into the more porous material.

Depending on the nature of their primary supports, plasters are relatively resistant to light, climactic fluctuations, and pests. However, they are vulnerable to movement, and over a long period of time, to salts migration.

Light

- Avoid direct illumination with daylight. Filter direct light with ultraviolet light filters.

RH

- Monitor relative humidity with read-out thermohygrograph. Calibrate four times a year. If fluctuations in RH exceed 40 percent, make the necessary adjustments by altering the temperature or humidity levels.
- If a very high RH is reached, it may cause damage to Plaster of Paris objects through partial dissolution and the formation of soluble salts. Adjust climate.
- Where incompatible materials are combined in one object, such as metal and plaster, note fluctuations in relative humidity.
- Note cracks or fissures.
- Note exfoliation (scaling) of plaster.
- Notice changes in color, surface texture, or sheen.
- Note changes in size or shape, indications of biodeterioration, or evidence of chemical reaction.

Pests

- Routinely check for insect infestation.
- Note presence of rodents or birds. Look for guano.

Care and handling

- Note failure to the architecture such as leakage, failure of mechanical systems, damage to roof, damage to drains, etc. that may affect the object.
- Dust once a year with soft, dry, natural-bristle brush without oils, waxes, or cleaning materials.
- Do not use proprietary cleaning materials of any type, such as Formula 409™ or Comet.™
- Do not oil, wax, apply paint, or any other material to the surface.
- Do not move.
- Do not apply attachments.
- Do not allow human contact, such as leaning, touching, etc.
- Do not allow residues from animals or insects.
- Install interpretive signage providing the title, artist, date of execution, and methods of execution of the object.
- If vandalism occurs, remove or repair the object immediately.

Handling and storage

- If an object made of plaster is moved, it should be well padded and guarded against impact or jarring.
- In cases of storage, the object should be well padded and supported.

4.7 Wall paintings

Wall paintings refer to paintings executed on a wall, as opposed to painting executed on other supports, such as canvas or board, and applied to the wall. Wall paintings encompass a range of materials and techniques. They include media-bound paints applied to dry plaster or other wall surfaces as well as wetted pigments applied to damp calcium oxide plaster, in which the pigments are bonded to create *buon* fresco or fresco painting.

The effect of the environment on wall paintings depends on the original materials and techniques of execution. The materials considered include the substrate, the primary support (discussed below) as well as the materials and techniques of the painting itself.

In addition to deterioration of the substrate or support, the paint layer itself deteriorates because of salts migration, microbiological growth such as mold and mildew, or chemical and physical alterations to the pigment or binder. Most conditions may be detected through close examination and observation of changes in color, texture, or evidence of deterioration byproducts, such as white salts efflorescence, mildew growth, or other residues.

Light

- Painting on plaster, like any painting, is adversely affected by ultraviolet light. Depending on the type of pigment, the paint may fade or otherwise alter. Therefore, it is necessary to filter direct light with ultraviolet light filters or to screen out the light with blinds.

RH

- Monitor relative humidity with read-out thermohygrograph. Calibrate four times a year. If fluctuations in RH exceed 40 percent, make the necessary adjustments by altering the temperature or humidity levels.
- Check for the presence of salts. Note surface efflorescence on the surface or crumbling or cracking of the surface plaster.
- Note cracks or fissures.
- Note powdering paint or plaster.
- Note changes in size or shape, indications of biodeterioration, or evidence of chemical reaction.

Pests

- Routinely check for insect infestation. Note powdery residue, presence of holes, and a hollow sound when tapped.
- Note presence of rodents or birds. Look for guano.

Care and handling

- Note peeling or flaking of paint or other surface film.
- Note cracks, fissures, exfoliation, disaggregation.
- Note failure to the architecture such as leakage, failure of mechanical systems, damage to roof, damage to drains, etc. that may affect the object.
- Dust once a year with soft, dry, natural-bristle brush without oils, waxes or cleaning materials.
- Do not use proprietary cleaning materials of any type, such as Formula 409™ or Comet.™
- Do not oil, wax, apply paint, or any other material to the surface.
- Do not move.
- Do not apply attachments.
- Do not allow human contact, such as leaning, touching, etc.
- Do not allow residues from animals or insects
- Install interpretive signage providing the title, artist, date of execution, and methods of execution of the object
- If vandalism occurs, remove or repair the object immediately.

4.8
Mosaics

Mosaic refers to a decorative or artistic rendering created by inlaying pieces of stone, tile, glass, or enamel into a cement mortar or plaster matrix. Mosaics may deteriorate because of the deterioration of the substrate or support (see plasters above), because of a failure of attachment, or because of weakening of the surface of the *tesserae*, i.e., mosaic pieces.

Light

- Avoid direct illumination with daylight. Filter direct light with ultraviolet light filters.

RH

- Monitor relative humidity with read-out thermohygrograph. Calibrate four times a year. If fluctuations in RH exceed 40 percent, make the necessary adjustments by altering the temperature or humidity levels.
- Note changes in size or shape, indications of biodeterioration, or evidence of chemical reaction.

Pests

- Routinely check for insect infestation. Note powdery residue, presence of holes, and a hollow sound when tapped.
- Note presence of rodents or birds. Look for guano.

Care and handling

- Note peeling or flaking of paint or other surface film.
- Note cracks, fissures, exfoliation, disaggregation.
- Note failure to the architecture such as leakage, failure of mechanical systems, damage to roof, damage to drains, etc. that may effect the mosaics.

Reverent Grove By Ned Smyth
Ron De Lugo Federal Building
Charlotte Amalie, VI
Art Conservation Associates

Left: Before conservation: Note the force of water from fountain causing damage to *tesserae*, i.e., mosaic tiles.

Center: During conservation: The conservator is replacing *tesserae*, i.e., mosaic tiles.

Right: During conservation: The conservator is cleaning *tesserae*, i.e., mosaic tiles.

- Dust once a year with soft, dry, natural-bristle brush without oils, waxes, or cleaning materials.
- Do not use proprietary cleaning materials of any type, such as Formula 409™ or Comet.™
- Do not oil, wax, apply paint, or any other material to the surface.
- Do not move.
- Do not apply attachments.
- Do not allow human contact, such as leaning, touching, etc.
- Do not allow residues from animals or insects.
- To prevent vandalism, erect a buffer zone or devise a division between human contact and the work of art.
- Install interpretive signage providing the title, artist, date of execution, and methods of execution of the object.
- If vandalism occurs, remove or repair the mosaic immediately.

4.9 Stained glass

Stained glass is a type of mosaic rendered with transparent glass traditionally secured in place with lead cames. The color is achieved by firing a stain into the surface of the glass after forming. Like mosaic, the condition of stained glass is partly determined by the condition of the substrate.

In architectural applications, stained glass is most often found in windows. The primary type of failure results from sagging of the lead cames. Glass *tesserae*, i.e., glass pieces may also be lost or damaged and require replacement. Moreover, damage may have occurred to the glass through faulty manufacture or harsh treatment.

Light

- Because direct daylight illumination is desirable for stained glass windows, it is impossible to avoid its contact. Heat exacerbates the sagging of lead cames. Depending on the amount of heat to which the window is exposed, note flexing and sagging of the lead.
- Note loosening of the glass.

RH

- Monitor relative humidity with read-out thermohygrograph. Calibrate four times a year. If fluctuations in RH exceed 40 percent, make the necessary adjustments by altering the temperature or humidity levels.

Pests

- Routinely check for insect infestation. For the exterior, examine the surface with binoculars if necessary.
- Note presence of rodents or birds. Look for guano.

Care and handling

- Note separation of glass from lead cames or from frame.
- Note cracks or fissures in the glass.
- Note presence of salts by efflorescence.
- Note failure to the structure such as leakage, failure of mechanical systems, damage to roof, damage to drains, etc. that may affect the stained glass.
- Dust once a year with soft, dry, natural-bristle brush without oils, waxes, or cleaning materials.
- Do not use proprietary cleaning materials of any type, such as Formula 409™ or Comet.™
- Do not oil, wax, apply paint, or any other material to the surface.
- Do not move.
- Do not apply attachments.
- Do not allow human contact, such as leaning, touching, etc.
- Do not allow residues from animals or insects.
- To prevent vandalism, erect buffer zone or devise a division between human contact and the work of art.
- Install interpretive signage providing the title, artist, date of execution, and methods of execution of the object.
- If vandalism occurs, remove or repair the stained glass immediately.

4.10 Mixed media/ collage

Because works in mixed media are made of a range of materials and methods, they are particularly delicate and subject to damage. In addition to materials already discussed, objects of mixed media may include textiles and paper. In dry conditions, these materials are particularly sensitive to deterioration.

Light

- Minimize contact of direct daylight.
- Filter light as necessary.

RH

- Monitor relative humidity with read-out hygrometer. Calibrate four times a year. Where paper and textiles are components of the object, RH should be maintained at between 45 and 65 percent. If there are fluctuations in RH greater than 20 percent make the necessary adjustments by altering the temperature or humidity levels.
- Note changes in size or shape, indications of biodeterioration, or evidence of chemical reaction.

Pests

- Routinely check for insect infestation.
- Note presence of rodents or birds. Look for guano.

Care and handling

- Note presence of powder.
- Note cracks or fissures in the glass.
- Note presence of salts by efflorescence.
- Note failure to the architecture such as leakage, failure of mechanical systems, damage to roof, damage to drains, etc. that may affect the stained glass.
- Dust once a year with soft, dry, natural-bristle brush without oils, waxes, or cleaning materials.
- Do not use proprietary cleaning materials of any type, such as Formula 409™ or Comet.™
- Do not oil, wax, apply paint, or any other material to the surface.
- Do not move.
- Do not apply attachments.
- Do not allow human contact, such as leaning, touching, etc.
- Do not allow residues from animals or insects.
- To prevent vandalism, erect a buffer zone or devise a division between human contact and the work of art.
- Install interpretive signage providing the title, artist, date of execution, and methods of execution of the object.
- If vandalism occurs, remove or repair the stained glass immediately.

4.11 Metals

Architectural arts may be composed of a wide range of metals. The chemistry and deterioration of metals is complex. Only cast bronze metals for outdoor sculptures are discussed here.

Bronze is an alloy of copper, tin, and zinc. In some cases, small amounts of lead and other metals are found in bronzes. Bronze sculptures are produced by one of several casting techniques. Although bronzes will form their own patina, or layer of corrosion (usually stable), with time, they develop a patina or are chemically treated to produce a desirable color and finish.

Bronzes, like all metals, corrode when in contact with acidic or alkaline materials. One of the chief causes of deterioration of metals in outdoor urban environments derives from atmospheric sulfur dioxide in combination with RH above 60 to 70 percent. Since little can be done to control the environment, conservators employ techniques to protect the bronzes against corrosion. This includes the application of coatings, such as synthetic varnishes and hot wax coatings.

RH

- In indoor environments, monitor relative humidity with read-out hygrometer. Calibrate four times a year. If the RH rises above 60 percent, lower it.
- Note indications of chemical reaction.

Pests

- Routinely check for insect infestation.
- Note presence of rodents or birds. Look for guano.
- In outdoor settings, immediately hose off guano as it is acidic and promotes deterioration.

Care and handling

- Note presence of corrosion.
- Note pitting.
- Note failure to the adjacent architecture such as leakage, failure of mechanical systems, damage to roof, damage to drains, etc. that may affect the object.
- Dust once a year with soft, dry, natural-bristle brush or clean, soft cotton cloth without oils, waxes, or cleaning materials.
- Do not use proprietary cleaning materialsof any type, such as Formula 409™ or Comet.™
- Do not use abrasives of any sort. These include stiff brushes, scouring pads, etc.
- Do not oil, wax, apply paint, or any other material to the surface.
- Do not apply attachments.
- Do not allow human contact, such as leaning, touching, etc.
- Do not allow residues from animals or insects.
- Clear drainage holes with a wire or stick so water may drain away from outdoor sculpture.
- Apply hot wax coating annually.
- To prevent vandalism, erect a buffer zone or devise a division between human contact and the work of art.
- Install interpretive signage providing the title, artist, date of execution, and methods of execution of the object.
- If vandalism occurs, remove or repair the object immediately.

Architectural Examination Form

This form accompanies the GSA Architectural Arts Maintenance Instructions.
Fill out this questionnaire together with the GSA Art Inspection Form.

Architect:

Engineer:

Building manager:

When examined:

Recent history of repair:

Interior structure and condition

Original/added structural material

Water damage

Other type of deterioration

Ceiling Construction

Wall Construction

Floor Construction

Lighting

Exterior structure and condition

Original/added structural material

Water damage

Other type of deterioration

Roof Construction

Flashing

Downspouts

Windows

Wall Construction

Lighting

This form can be enlarged by photocopying it at 130% to fit on letter size paper.

Environment

Attach relative humidity records during the course of one year. RH should be noted in the morning and the late afternoon. The thermohygrograph should remain in the same location in the room.

Type of monitor:

Date last calibrated:

Instrument used for calibration:

Highest RH:	Duration:	Date:
Lowest RH:	Duration:	Date:
Average RH:	Frequency:	

Climate control devices/measures used in building or room

Type of heat?

Type of AC?

Are windows opened at any time of the year?

Blinds used?

Fans?

Are there humidifiers? Are they maintained? At what time of year are they used?

Are there desiccators?

Air purification systems?

UV filters in window?

Who is in charge of maintenance? Location of records?

This form can be enlarged by photocopying it at 130% to fit on letter size paper.

Appendix

Lighting – UV Bulbs and Filters

UV Filtering Bulbs, Rapid Start
UV Filtering Bulbs, Instant Start
Filter Ray UV Shields, 48" and 96"

Light Impressions
800-828-6216
www.lightimpressionsdirect.com

Window Filters

3M™ Scotchtint™ Sun Control Films

3M Company
888-364-3577
www.3M.com

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Catherine Myers, Conservator of Architectural Materials, Washington, DC

Local Conservators
American Institute for Conservation of Historic & Artistic Works (AIC)
202-452-9545
www.aic.stanford.edu

Regional Alliance for Preservation (RAP)
www.rap-arcc.org

U.S. General Services Administration
Public Buildings Service
Office of the Chief Architect
Design Excellence and the Arts
1800 F Street, NW
Washington, DC 20405

202-501-1888

U.S. General Services Administration