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SOME THOUGHTS ON MUSEUM ENVIRONMENTS IN EXISTING BUILDINGS

The New Orleans Charter

> The New Orleans Charter [for Joint Preservation of Historic Structures and Artifacts] is the product resulting from the two symposia: *Museums in Historic Buildings* held in Montreal, Quebec (1990) and New Orleans, Louisiana (1991) and co-sponsored by the American Institute for Conservation of Historic and Artistic Works (AIC) and The Association for Preservation Technology International. This Charter has been officially adopted by the Board of Directors of both AIC and APTI.
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> The New Orleans Charter was subsequently adopted by the National Conference of State Historic Preservation Officers at its Annual Meeting in Washington, D.C. in March, 1992.[1]

Arising from a concern for the coexistence of historic structures and the artifacts housed within them;

Recognizing our responsibility as stewards to provide the highest levels of care for the structures and other artifacts placed in our care;

Recognizing that many significant structures are used to house, display and interpret artifacts;

Recognizing that historic structures and the contents placed within them deserve equal consideration in planning for their care;

Recognizing that technologies and approaches will continue to change; and

Recognizing that those involved in preservation are part of a continuum, and are neither the first nor the last to affect the preservation of historic structures and artifacts;

[1] The quote is copied from the palimpsest.stanford.edu website

We, therefore, adopt these principles as governing the preservation of historic structures and the artifacts housed in them:

1.Institutions' statements of mission should recognize the need to preserve the unique character of both the historic structure and artifacts.

2.The preservation needs of the historic structure and of the artifacts should be defined only after study adequate to serve as the foundation for the preservation of both.

3.Requisite levels of care should be established through the interdisciplinary collaboration of all qualified professionals with potential to contribute.

4.Appropriate preservation must reflect application of recognized preservation practices, including assessment of risk before and after intervention, and the expectation of future intervention.

5.Measures which promote the preservation of either the historic structure or the artifacts, at the expense of the other, should not be considered.

6.Regarding public use, the right of future generations to access and enjoyment must outweigh immediate needs.

7.Appropriate preservation strategies should be guided by the specific needs and characteristics of the historic structure and artifacts.

8.Appropriate documentation of all stages of a project is essential, and should be readily accessible and preserved for the future.

9.The most appropriate action in a particular case is one which attains the desired goal with the least intervention to the historic structure and the artifacts.

10.Proposed preservation strategies should be appropriate to the ability of the institution to implement and maintain them.

There is a conflict between the need to preserve existing buildings and the need to preserve collections: conditions which are ideal for a collection are not always ideal for a building. This is typical for all museums in buildings which are not built specifically to house collections and has led to the adoption of the New Orleans Charter. The discussion which follows, and the subsequent recommendations, are intended to comply with the Charter. The environmental factors considered include relative humidity, ambient temperature, light, ventilation, and air quality. Each is discussed separately below.

Relative Humidity

The most important environmental characteristic to control is relative humidity. High humidity leads to unwanted biological growth such as mold and fungi, low humidity to brittleness in some materials. Rapid variation in humidity stresses all materials but is particularly harmful to objects composed of multiple pieces attached to one another (as in furniture). In this climate, low humidity is a problem in heated buildings during the winter and high humidity during the summer.

Objects conservators generally recommend using mechanical humidification and de-humidification to maintain humidity in mixed collections at 50%, ± 5%.

Building Conservators recognize bad effects on buildings from humidity extremes.

In winter, low humidity causes building elements, particularly wood, to shrink, opening cracks and causing splits. But increasing the humidity causes condensation on cold surfaces. This condensation in concealed spaces leads to rot, mold and fungi;and on exposed surfaces leads to failure of finishes. Because of the difficulty of preventing condensation in existing buildings, it is generally recommended that no moisture be added to dry winter air. The best method to raise humidity in cool weather is to cool the building.

In the summer, high humidity during warm weather nourishes molds and fungi. But de-humidification is usually only partially effective, primarily because of air leaks through the building envelope.

Building conservators find that constant 50% humidity can only be achieved under highly controlled circumstances, not achievable in an existing building without damaging the historic fabric.

It is possible to reduce humidity variation by taking advantage of the buffering effect of the building envelope, and using the heating system for limited control of humidity. Since the relative humidity is driven down by heating a space, heat should be kept to a minimum during the cold, dry season. When there is danger of biological growth (humidity above 65%) spaces should be heated to reduce the humidity.

It is not possible to obtain optimum humidity in most buildings for the collection without damaging the building. The best that can reasonably be achieved is probably a gradual seasonal change from about 60% in the summer to about 30% in the winter. If the gradual change is to be achieved, air changes must be minimized; windows and doors must be kept closed, and the heating system controlled with a humidistat.

Temperature

High temperatures accelerate chemical decomposition. Cold temperatures cause freezing.

Objects conservators recommend a constant, cool temperature to reduce the physical stresses caused by differential expansion and contraction of materials. Furniture is particularly susceptible to variation in temperature and plywood or veneers are at great risk from large variations. Any temperature swings should be gradual. Optimum conditions for mixed collections are 65º F ± 5º F, year around.

Building conservators are less concerned with temperature variations except for rapid fluctuations and freezing. If a building is equipped with a heating system, one of the easiest variables to control is low temperature. Except for the danger of pipes freezing, the building is not terribly sensitive to variations in temperature and, in fact, since many existing buildings were traditionally unheated in winter, interior temperature is perhaps best allowed to float with the exterior temperature, provided the pipes are drained. This reduces the incidence of ice damming at eaves, as well as physical stress on components, such as doors and windows, which are subject to differential temperatures on opposite sides. The most effective control of (infrequent) high temperatures is to keep a building shut, with windows draped or otherwise blocked during warm days, opening it to cool breezes in the evening.

Combining these needs, the optimum temperature compromise is one which allows modest gradual changes in temperature with the seasons. If there are water pipes in the building, the lowest temperature in winter should be above freezing. The highest temperature in summer should be the ambient temperature, as buffered by a closed building and drapes or shades. If the heating system is controlled by a humidistat, it should have a low temperature thermostat override to prevent the pipes from freezing.

Light

Light induced deterioration primarily affects organic materials. Light is a form of energy that breaks chemical bonds, thus causing decay. The damage caused by light depends mainly on the nature of the object, the relative humidity, the kind of light or other radiant energy present (e.g. UV, IR), the intensity, and the duration of exposure. Light-induced deterioration is controlled in various ways, but principally by minimizing illumination intensities and duration, and by storing objects in dark places.[2]

Objects conservators recommend storing objects in the dark. Objects on display should be lighted with the minimum light necessary to reveal the object, and only when the object is actually being viewed. Valuable objects should be displayed for the shortest length of time possible, never on permanent display.

Building conservators are aware of the need to display historic buildings in order for them to have educational value. To be displayed properly, they must be shown in light. Damage from light generally cannot be prevented on the exterior except through the use of protective coatings. In the interior, conservators recommend blocking the light with opaque blinds or shutters when the building is unoccupied, and filtering the light when the building is occupied. Artificial light should used as little as possible and at the lowest intensity compatible with proper display.

Regarding the exterior, keep exterior wood painted. Masonry and tinted cementitious materials tend to fade but degrade slowly, if at all, with exposure to light; since fading is an inherent characteristic of the materials, it is appropriate to allow the natural color shift.

Regarding interior window coverings, there are several alternatives:

1. Leave the windows undraped. Accept light-induced deterioration as the price of interpretation, and;
   a. Provide temporary blinds which can be inserted when the building is empty, or,
   b. Provide film or plexiglass filters. We do not generally recommend the use of films: drawbacks include gradual (invisible) loss of UV filtering effectiveness, and damage to original windows when films must be replaced. Plexiglass is preferred for its durability and ease of replacement. Select plexiglass filters with 100% UV screening and the highest degree of visible light screening which does not appear offensive.

[2] "New Tools for Preservation," Reilly, Nishima, and Zinn, Image Permanence Institute, Rochester Institute of Technology, 1995.

2. Provide heavy drapes. Keep them closed when spaces are unoccupied.

Air Quality

Pollution-induced deterioration refers to air-borne particles and chemicals. The effect of such deterioration varies widely depending on the specific material involved.

Objects conservators recommend reducing air flow to the minimum acceptable, and enclosing particularly sensitive materials (for example silver) in air-tight containers.

Building conservators recommend control of pollution-induced deterioration principally by filtration of induced air. For this to be effective, the envelope of the building must be relatively air-tight, and fresh air limited to that necessary for ventilation purposes. Fans are required to move the air.

There is a conflict between displaying a building as it was originally intended to be used, and conservation of both objects and the building. But most building materials are not highly sensitive to this type of deterioration. If there are sensitive objects in the collection they should be displayed as little as possible, and under cover if possible. Windows should be kept closed.

Environmental Decisions

All of the above discussion is based on general principles of building and collection care. In order to make specific recommendations and to design improvements it is necessary to have actual measurements of the variables discussed above, as well as a well–articulated, institution-wide, preservation and interpretation philosophy.

Data collection. To make recommendations for permanent improvements to the interior environment it is necessary to understand the present interior conditions and exterior microclimate. Monitoring equipment can be hygrothermographs or dataloggers (dataloggers are preferred). At least one device on each floor and one in the basement should be monitored for at least a year. The microclimate may be quite different from the local airport or other location where weather observations are being made. To understand the local climate, weather observations should also be made outside, on site, for at least a year.