Museums

Museums in general

A museum is an institution that cares for a collection of artifacts and other objects of scientific, artistic, cultural or historical importance and makes them available for public viewing through permanent or temporary exhibits.

One of the main problems encountered by museums is the potential deterioration of the valuable artifacts caused by exposure to the surrounding environment.

The effective safekeeping of a museum collection is assured by providing the proper environmental conditions protecting against the different agents of deterioration.

The different agents of deterioration

Understanding how the environment affects a collection and how to monitor and control the different causes of deterioration is the most important part of a preventive conservation program.

Deterioration is the process of becoming progressively worse. It can be the result of an object seeking a state of physical and chemical equilibrium with its immediate environment.

The major causes of deterioration are:

- ***Temperature***
- ***Relative humidity***
- ***Light***
- ***Air pollution***

We will focus here on both temperature and relative humidity.

Paintings by Andy Worhol.

Relative humidity

Relative humidity will cause a chemical (structure change) or a physical deterioration of the object.

High humidity:

- Promotes chemical reactions because chemical reactions require water.
- Supports mold growth and other biological threats.
- Causes rust and other types of corrosion.

Low humidity:

- Can cause organic artifacts to become brittle and eventually crack.
- Can cause embrittlement of various types of fibers.

Fluctuating humidity:

- Allows for shrinking or swelling of organic materials.
- Can cause crushing or fracturing of constrained organic materials.
- Can cause delamination of layered organic materials.
- Promotes the loosening of various joints or connections.

Each artifact requires its own individual environment corresponding to its precise needs. If the level of humidity is too high, the artifact may hydrate. If it is too low, the artifact will dehydrate.

continued

Facts & Figures

- The word "museum" was originally from the Greek mouseion , which denotes a place or temple dedicated to the Muses or the seat of the Muses. Muses were the patron divinities of the arts in Greek mythology.
- The first museum is considered to have been created by Plato in Athens.
- The most visited museum in the world is the Louvre in Paris: 9.7 million (in 2012) visitors per year!
- According to the American Alliance of Museums, there are about 17,500 museums in the United States.
- There are approximately 850 million visits each year to American museums, more than the attendance for all major league sporting events and theme parks combined (483 million)

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Temperature

Temperature will cause a chemical (structure change) or a physical deterioration of the object.

High temperature:

- Causes gradual disintegration or discoloration of organic materials.
- Causes melting or softening of plastics, waxes and resins.

Fluctuating temperature:

- Causes fractures in solid materials.

Each artifact will need its own individual environment exactly to its temperature requirements.

Why the need to measure relative humidity and temperature?

Relative humidity:

All organic and some inorganic materials are dependent on the environment. Some artifacts will absorb water and others will emit water.

Artifacts: Mexico Museum . . . National Archaeological Museum, Athens, Greece.

Bronze statue of The Thinker by Rodin . . . Mona Lisa, Leonardo Da Vinci . . . Horniman Museum.

Relative humidity will affect the following materials. The number in parentheses represents the optimum ranges of relative humidity for each material. Fluctuation of relative humidity should not exceed +/- 5%.

- Metal (<35%rh)
- Dyes (40...60%rh)
- Wood (45...60%rh)
- Ivory (45...60%rh)
- Paper (45...60%rh)
- Canvas (45...60%rh)
- Leather (45...60%rh)
- Paint (45...65%rh)

Temperature:

Temperature is a measure of the motion of molecules in a material. If the temperature increases, the molecules speed up and spread out causing the material to expand. When the temperature decreases, the molecules slow down and come closer together causing the material to contract.

The recommended temperature for most materials is around 20°C or lower if possible. The most important criteria in maintaining a proper temperature is that it should not fluctuate.

Relative humidity and temperature:

Relative humidity and temperature are interrelated. Warmer air can hold more water vapor because the increase in temperature causes the air molecules to move faster and spread out, creating more space for more water molecules.

In a closed environment, if the temperature decreases, the relative humidity will increase. If the temperature increases, the relative humidity will decrease.

Material types

Organic:

Products derived from things that were once living. All organic materials are hygroscopic.

Inorganic:

Inorganic objects have a geological origin and may be porous.

Composite:

Made from two or more materials.

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