SAVING YOUR Treasures

A Website about what you can do to protect and preserve the things of importance in your life

Gerald R. Ford Conservation Center
Nebraska State Historical Society
1326 S. 32nd Street, Omaha, NE 68105 (402) 595-1180, Fax: (402) 595-1178
nshs.treasures@nebraska.gov
www.nebraskahistory.org

TIME CAPSULES AND PRESERVATION

Time capsules are used by people as a means of communicating and sharing with future generations. Capsules may contain everyday documents discussing the political, social, and general interests of the time as well as more intriguing items that paint a picture of the people who created the capsule. The prognosis for the safe survival of time capsule contents is not very good; however, there are measures that can be taken to improve the chances of better preservation for time capsule contents.

The Capsule

It is important to use a strong, waterproof enclosure that can be sealed. The water proofing of the capsule is the most important factor in the preservation of the contents. Canisters can be made of copper, aluminum, stainless steel, glass, or large diameter polyethylene pipe. Sheet metal fabricators and metal workers can help make and seal metal containers.

The capsule can be sealed either with a screw-cap closure and a gasket or a welded join. Glass containers can be sealed with silicone sealant. Soft solder should not be used because the solder will deteriorate allowing water and moisture to enter the container and damage the contents. Large diameter polyethylene pipe end-caps can be heat-sealed and the cap threads can be sealed with thin Teflon tape. Polyethylene sheeting and bags will become permeable to moisture with age, so it can not act as a primary moisture barrier layer.

If your capsule is not water and moisture tight, the contents will deteriorate.

DO NOT use polyvinylchloride (PVC) pipe, bags or plastic containers in or as the capsule. Some of the chemical components in PVC are naturally unstable and break down in a process that cannot be reversed, releasing acids into the canister that will attach other items in the canister.

Favorable Conditions for a Safe, Effective Time Capsule

In order to preserve the contents of your time capsule it is important to exclude as much water and oxygen as possible. If the capsule is closed and sealed in a cool, dry environment, it may be possible to limit the amount of moisture that is trapped in the capsule which will lessen the amount of damage to the contents. However, it is better to

use a more active method to keep the interior environment dry than relying on the ambient temperature and relative humidity the day the capsule is sealed.

Water and Moisture
Silica gel is a substance that can help to buffer the humidity in the capsule. It is a granular material that absorbs and gives off moisture vapor to create an equilibrium in the relative humidity in a closed space. At least one-fifth of the capsule's volume should be packed with silica gel to provide enough buffering to make the interior as dry as possible. The gel must be conditioned to a low humidity level before it is used and should be isolated from the contents in the capsule by placing it in a cotton bag. Place the contents into the capsule first and then add the silica gel filled bag. Seal the capsule soon after adding the silica gel. Silica gel is sold in granular or powder form in art supply stores, hardware stores, and some department store closet shops. Follow the manufacture's instructions for conditioning the silica gel. ART-SORB®, a more costly but easy-to-use form of silica gel, is available from conservation suppliers. (See the Supplier List)

Oxygen Removal
Oxygen will still play a part in the degradation of the items in the time capsule, even without the presence of water. Argon or nitrogen gas may be introduced into the capsule just before it is sealed to replace oxygen and air. Bottled gas companies supply these gases. Another method for removing oxygen in the capsule is to use the product Ageless®. Ageless® is a powder or granular substance often supplied in tablet form. It is an oxygen scavenger and when sealed in a small space will grab up any available oxygen that might be in the container. It should be placed in the container just before sealing the container and should not be placed near heat-sensitive items as it generates heat as it reacts with oxygen. Ageless® is available from conservation suppliers.

Location
The place the capsule is located should be dry whether in the ground, in a wall cavity, or in a base or plinth. A time capsule can be placed inside a cement burial vault for added protection, or coated with asphalt- or pitch-impregnated fabric to keep out water. If the capsule is placed in a cornerstone, make sure the area is northerly or otherwise sheltered from extreme fluctuations in temperature caused by sun heating. The area should also be vibration-free.

A complete list of all the contents should be included in capsule. The list should describe the materials, appearance, and significance of each object.

Notes on Stable and Unstable Materials for Inclusion
Electronic Media
Electronic media can be very problematic in a time capsule. Videotapes, audio tapes, and compact disks may be a problem because the equipment to play them back may not be available when the time capsule is opened. If you do choose to include such items remember to include instructions and playback equipment. Information about the

software and hardware required can be important. Media carriers can also be made of unstable plastics with short life spans.

Photographs
Photographic prints on paper should fare well. Prints on resin coated papers and some newer printer papers may not last as long. Negatives on unstable plastic carriers such as acetate and nitrate film stock will not survive. In general, properly processed, fiber-based, black-and-white photographic prints, preferably treated with gold, selenium or poly-sulfide toner on archival quality paper with an alkaline reserve of pH 7.5-8.0 will keep best. Remember, color prints and slides can fade even when kept in the dark. Digital prints may not last as long as traditional prints. Information about the stability of digital prints is available online at www.imagepermanenceinstitute.org and www.wilhelmresearch.com.

Newspaper
Newsprint is acidic and deteriorates quickly. An alternative for including newsprint is to make photocopies of the newspaper on archival quality acid free lignin free paper (high-alpha cellulose) with an alkaline reserve of pH 7.5-8.0 and include these with the newsprint in the capsule. The acids in newsprint will make the environment inside the capsule acidic, so it should be isolated from other materials.

Rubber and Other Unstable Plastics
Objects made of rubber and other unstable plastics, like those used to make squeeze balls, should not be placed in time capsules since rubber and some plastics deteriorate over time, releasing sulfur and other pollutants which will attack other materials in the container. Items made of or containing polyvinyl acetate (PVAC), polyvinylidene chloride (plastic food wrap), or PVC will deteriorate even in a sealed capsule and will release acetic acid and hydrochloric acid as they age.

Wood
All wood, especially oak, gives off acid vapors and will harm other materials in the capsule.

Textiles
Textiles should be clean and insect free. Cotton can act as a humidity buffer in the capsule when the temperature fluctuates. Polyester fabrics will most likely remain stable. Silk will deteriorate and give off sulfurous pollutants. Wool and hair contain sulfur and will off gas corrosive gases.

Food Products
Most food products will deteriorate and damage other items ion the capsule.

Also see the **Materials Guidelines** for a list of stable and unstable materials.

Sources

Barclay, Robert L. 1996. "Time Capsules." *CCI Notes* N1/6. Ottawa: Canadian Conservation Institute.

Minnesota Historical Society. 2003. "Building a Time Capsule: Guidelines for Preserving Materials." http://www.mnhs.org/preserve/conservation/timecapsule.html.

Smithsonian Institution, Museum Conservation Institute. 2006. "Time Capsules: Archival Protection." http://www.si.edu/mci/english/learn_more/taking_care/timecaps.html.