

Essentials for Cemetery Monument Care

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Welcome

Welcome to today's TELNPS course titled, Essentials for Cemetery Monument Care. This class will last from 1:00PM to 4:00 PM EST on January 30, 2007 and will consist of live instruction via Technology Enhanced Learning (TEL) from the US Fish and Wildlife Service National Conservation Training Center in Shepherdstown, West Virginia. Thank you for joining us today. We look forward to your participation.

Why a course on Essentials for Cemetery Monument Care?

Throughout the National Park Service, approximately 50 units have cemeteries and/or stone monuments that are a part of our nation's cultural heritage. They vary in age from the 1700's at sites such as Mikveh Israel Cemetery at Independent National Historic Park to present-day Arlington National Cemetery. All cemetery monuments need maintenance in order to preserve their integrity. Misguided maintenance, such as the use of commercial grade pressure washers on stone grave markers, can do more harm than good and cause irreparable damage to stone. In addition to using appropriate tools and equipment on stone, proper documentation and maintenance plans are important parts of preserving this part of our cultural heritage.

This course emphasizes sound preservation decision-making in hands-on treatment of headstones. Learners will be able to design surveys, create long-term plans, understand deterioration mechanisms, implement basic resetting techniques and choose appropriate cleaners for stones

As a participant you will also see two 10-minute video segments on cleaning and resetting of grave markers, view digital photographs, participate in a condition survey exercise, participate in question and answer sessions, and view appropriate tools for cemetery preservation work.

Pre-course Reading Assignments

Prior to the class, please read the five pre-course reading assignments designed to give you additional course background.

These reading assignments are located on the TEL website @ <http://www.nps.gov/training/tel/schedule.htm> -under the January 30th listing.

The readings are:

Philosophy – 1 page

AIC Code of Ethics – 11 pages

Secretary of Interior’s Standards – 4 pages

Secretary of Interior’s Guidelines – 6 pages

Stopping the Hands of Time Article – 2 pages

Audience

The course is designed for maintenance staff and personnel responsible for the care of historic cemeteries; cultural resource specialists who oversee the care of stone monuments, including grave markers and commemorative monuments; archeologists assigned the responsibility for care and maintenance of grave sites or cemeteries; and architectural and/or objects conservators

How to Interact with the Instructors

We encourage you to ask questions and share your comments with the instructors throughout this TELNPS course.

If you were physically in the classroom with the instructor, you would raise your hand to let her/him know you had a question or comment. Then you would wait for the instructor to recognize you and ask for your question. We are all familiar with that “protocol” for asking questions or making comments.

With TELNPS courses, there is also a “protocol” to follow to ensure you can easily ask questions and others can participate as well. It may seem a little strange at first asking a question of a TV monitor. Remember, it is the instructor you are interacting with and not the monitor. As you ask more questions and participate in more TELNPS courses, you will soon be focusing

only on the content of your question and not the equipment you are using to ask it.

As part of the TEL station equipment at your location, there are several push to talk microphones. Depending on the number of students at your location, you may have one directly in front of you or you may be sharing one with other students at your table.

When you have a question, press and hold down the push to talk button maintaining at distance at least 12–18 inches and say, “Excuse me [instructor’s first name], this is [your first name] at [your location]. I have a question (or I have a comment).”

Then release the push to talk button. This is important. Until you release the button, you will not be able to hear the instructor.

The instructor will acknowledge you and then ask for your question or comment. Stating your name and location not only helps the instructor, but also helps other students who are participating at different locations to get to know their classmates.

Instructors

Your instructors are Mary F. Striegel and Jason W. Church. Mary Striegel is the Chief of Materials Research for the National Center for Preservation Technology and Training (NCPTT) in Natchitoches, Louisiana where she directs NCPTT’s research efforts that focus on understanding cultural resource decay and developing new treatment strategies. Striegel holds a Ph.D. in Inorganic Chemistry from Washington University in St. Louis. She specializes in understanding the decay of stones and metals. Striegel’s past work includes uses of technical photography in studying painted materials, development of chromatography techniques to identify paint binders, and understanding the interaction of air pollution with cultural materials such as limestone or marble historic buildings and monuments.

Jason W. Church, NCPTT Materials Conservator, specializes in preservation issues associated with historic cemeteries. Church holds a MFA in historic preservation from the Savannah College

of Art and Design and a BS degree in Building Sciences from Appalachian State University. Prior to coming to NCPTT, Church was the conservator for the Department of Cemeteries, City of Savannah, GA. Currently, he implements the Center's National Cemetery Preservation Initiative, including the popular Cemetery Monument Conservation workshops.



Coarse Goal and Learning Objectives

Coarse Goal: This course emphasizes sound maintenance techniques for cemetery and commemorative monuments that are sustainable, cyclic, non-invasive, and do no harm. The course will address documentation, maintenance plans, stone deterioration, cleaning, and resetting headstones.

Objectives:

After this workshop, learners should be familiar with

- Causes and effects of stone deterioration
- Ethics of conservation treatment strategies
- The use of a long-term maintenance plan
- Perform visual inspection of headstones

Additionally, learners will be able to

- Document the condition of grave markers
- Carry out basic cleaning of some stones
- Stabilize and reset small monuments with few complications



Agenda

Background: Cemetery Monument Care

- Overview of National Center for Preservation Technology and Training (NCPTT) and Its Mission
- Threats to Cemeteries
- Material Issues
- Cemetery Master Plans
- Cleaning: who's Taking Care of Grandpa's Grave?

Break

Maintenance Methods

- Cleaning continued. . .
- Why Should We Clean?
- Cleaning Methods (with video demonstration)
- Basic Resetting (with video demonstration)
- Questions
- Course Conclusion



Overview of NCPTT and its Mission

Refer to Handouts titled, **NCPTT In Brief, Materials Research Program**, and **NCPTT at Issue**, found in the file entitled [TEL NCPTT INFO.PDF](#).

The National Center for Preservation Technology and Training, an office of the National Park Service, was created by Congress in 1992 to develop and disseminate preservation technologies and to train practitioners in new technologies. NCPTT promotes preservation technologies in the fields of **archeology, historic architecture, historic landscapes, and materials conservation**.

NCPTT protects America's historic legacy by equipping professionals in the field of preservation with progressive technology-based research and training.

NCPTT conducts in-depth research about current preservation issues at its laboratories in the historic Lee H. Nelson Hall on the campus of Northwestern State University in Natchitoches, Louisiana. The Center's research—including research developed across the country through our grants program—is available at little or no cost to our users.

Many of America's most treasured cultural resources have benefited from NCPTT's research, including the Statue of Liberty, Congressional Cemetery and a number of National Parks.

NCPTT's training courses show participants the most advanced preservation practices through hands-on use of the latest technologies in real-world settings. Respected professionals in the fields of archeology, architecture, materials research and historic landscapes develop and instruct our courses, ensuring a training experience that is comprehensive and relevant.

These training programs focus not just on the "how" of preservation, but the "why" as well. We enable participants to return to their jobs with a holistic perspective and a thorough knowledge of the tools at their disposal.

NCPTT operates five major program including (1) archeology and collections, (2) architecture and engineering, (3) historic landscapes, (4) materials research, and (5) heritage education -- Louisiana.

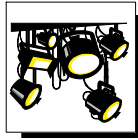
The major goals of the Materials Research Program are

- to understand how cultural resources decay and
- to develop new technologies and treatments to protect cultural resources from threats.

NCPTT began a national initiative in cemetery preservation in 2001. From this initiative, we have developed a suite of specialized training workshops for a wide range of audiences. The flagship workshops are the Cemetery Monument Conservation series that has been on-going since 2003. These three-day regional workshops provide professionals with the latest trends and techniques for conserving historic cemeteries and emphasize hands-on participation.

Other courses in this suite include:

- Cemetery Monument Conservation Basics course, similar to this TEL course, and
- Advanced Techniques in Cemetery Conservation.



Threats to Cemeteries

Cemeteries are made up of a wide range of materials which respond differently to physical and chemical threats. Threats to monuments may be manmade or natural.

Some manmade threats include:

- Inappropriate maintenance and management practices
- Vandalism and Theft
- Inappropriate treatments and repairs

Some natural threats include:

- Effects of Air pollution
- Biodeterioration
- Water-related deterioration
 - Including rising groundwater
- Inherent vice
- Corrosion
- Invasive flora or fauna
- Disasters



Material Issues

Before any cleaning or conservation begins it is important to consider the specific materials involved. Keep in mind that different types of stone react differently to cleaners and treatments.

- If possible identify the type of material or materials to be cleaned.
- Evaluate the condition of the surface prior to cleaning. Is it;
 - Powdery
 - Sugaring
 - Flaking
 - Spalling
- Will cleaning or treatment remove original material?

The main stone types involved in cemetery monuments are;

- Marble
- Limestone
- Granite
- Slate
- Sandstone



Cemetery Master Plans

A Master Plan is a road map that shows us where the cemetery is and where it is going. Master plans may be quite simple or more complex and may include several sections. They should always be tailored to the needs of the individual cemetery and will develop and evolve over time.

Documents in a master plan may include:

- Documentation
- Condition surveys
- Conservation treatment plan
- Maintenance plan

A good place to start is with documentation of the conditions of the cemetery through the location or creation of a map, a written survey and photographs. Information can be collected by trained volunteers or staff. It is important to put thought into deciding what information is important to the specific cemetery. Using a systematic approach to collecting the information is essential.

Written surveys may be collected on paper, or using computers and PDA's and databases. More advanced techniques may include using GPS systems and GIS databases.

Types of written surveys may include:

- Historical Documentation (primary resources)
- Evaluation of Safety Issues
- Record of Cemetery Conditions
- Information for developing work specifications
- Information for developing cost estimates

One important tool for the written survey is the survey form. This form reflects the important information you want to know about the cemetery and may include historical, genealogical and condition information. There are many survey forms available,

as seen in Appendices B and C. It is important to note that there is not a “one-size-fits-all” survey form. Again, you need to tailor your form to your informational needs.

Key first steps to creating the master plan are:

- Locate or create a map
- Create a plan of attack suitable for the size of your cemetery
- Accurately record descriptions
- Document conditions
- Photograph grave markers and monuments
- Organize information in a database
- Involve the community

Once documentation and condition assessment are completed, a conservation treatment plan may be created as part of the master plan.

- Involve Professionals
- Identify conservation needs
- Emergency stabilization
- Safety
- Landscape stabilization
- Establish Priorities
- Undertake field work

It is important to prevent damage to cemeteries whenever possible. One way to minimize manmade threats is to create a maintenance plan within the master plan. Maintenance plans may specify:

- Day-to-Day activities
- Mowing and equipment needs
- Weed Removal
- Periodic maintenance

- Fertilizers and Biocides
- Irrigation
- Long-term maintenance
- Regular inspection
- Education /Training requirements



Ethics

When approaching any cemetery project, we need a basis for decision making. Fortunately, others have spent quite some time thinking about the ethics and philosophy of conservation and preservation treatments. They have given us a series of tools found in several documents which were assigned as part of the pre-course reading. They include the American Institute for Conservation's Code of Ethics and Guidelines for Practice and the Secretary of Interior's Standards for the treatment of Historic Properties. To summarize these documents, it is important for us to consider the following:

1. First and foremost: Do No Harm.
2. Respect and retain the historic fabric and original material.
3. Minimize impact.
4. Understand chemicals used.
5. Be authentic.
6. Identify repairs.
7. Document activities.
8. Maintain and protect the resource.

Who's Taking Care of Grandpa's Grave?

In this part of the course we will cover the importance of identifying the monuments materials before beginning any work as well as characteristics of the most common stone types found in cemeteries.

The next part of this section we will cover the fundamentals involved in cleaning a stone monument. This begins with question, why do we want to clean the stone? Once you have decided to clean (or not) you must look at the considerations for the different types of cleaning methods. This includes how to choose an appropriate cleaner for your stone.

Once a method and possibly a cleaner have been selected we will cover the best approach and hands-on technique to clean the stone.

Aside from basic cleaning one of the easiest and most effective types of cemetery preservation is the resetting of fallen or leaning stones. In the later part of this section we will cover a few of the major types of monuments and the best ways to reset each of them.



Cleaning Methods,

What is the reason for cleaning the monument?

- Soiling
- Staining
- Particulate Matter/Gypsum crusts
- Biological growth
- Vandalism/graffiti

What are some considerations regarding cleaning methods?

- Acceleration of deterioration
- Loss of original materials
- Long-term stability of monument
- Long-term affects of cleaners

Types of Cleaning:

- Chemical
- Mechanical
- Combination

Acceptable products for Chemical Cleaning;

- Non-ionic detergents
- ph neutral or ph similar to that of the stone
- Surfactants
- Solvents
- Biocides
- Intermittent water misting

Unacceptable products for chemical cleaning;

- Salt-base cleaners
- Harsh acids
- Harsh bases

Acceptable methods of mechanical cleaning;

- Low pressure, power-washing
(less than 300 psi, with caution and proper application)
- Mechanical agitation using soft bristle brushes

Unacceptable methods of mechanical cleaning;

- Sand blasting
- High-pressure power-washing
(greater than 300 psi)
- Grinders
- Wire brushes

Dos and Don'ts of Cleaning

Don'ts

- Don't remove original surfaces
- Don't use bleach or other salt laden cleaners
- Don't power wash with high pressures
- Don't sand blast or use harsh mechanical methods such as power tools
- Don't use strong acids or bases

Dos

- Do no harm
- Do select the gentlest cleaning method to accomplish the task
- Do perform small test patches before cleaning the entire stone
- Do follow manufacturers' recommendations
- Do follow manufacturers' safety guidance
- Do exercise patience

Beginning Basic Cleaning

- Consider gentlest method available
- Follow manufacturer's instructions
- ALWAYS use soft bristle brushes
- NEVER use a wire brush
- NEVER use power tools, such as power washers, grinders, or sanders
- ALWAYS Soak the Stone before Cleaning
- Start Cleaning From the Bottom and Work Up
- Use a Small Circular Motion
- Use LOTS of Water



Basic Resetting

Different Base Types

- Buried Stone (Ground Supported)
- Slotted Base
- Stacked Base

For ground supported monuments

- Level and plumb
- Proper drainage
- Ground compaction

For monuments with a slotted base

- Stabilize and level base
- Remove any old mortar or adhesive
- Clean out inside of slot
- Once Leveled,
- Remove any existing adhesive or mortar from the bottom of headstone
- Clean headstone
- Dry-fit headstone into base
- Fill slot with a lime based grout or mortar

- Lead wedges may be used to help space stone in slot and stabilize it
- Clean off any pushed out mortar
- If voids, they must be pointed or back filled
- Stone must be kept stable until set

Monuments with a stacked base

- Usually has multiple smaller sections stacked together
- May or may not have any reinforcements
- Can range widely in size
- May have to involve lifting equipment
- Each base is equally important
- Same procedure multiply times
- Foundation is critical!
- Removal any old mortar or adhesive
- Clean all surfaces that connect
- Check each part for level and plumb as you go
- Lead spacers should be used between larger bases
- This helps keep bases apart so that mortar will stay
- Lead is self-leveling under pressure

- Lime mortar or setting compound can be used
- Each seam must be pointed or filled to prevent water intrusion

Monuments with a stacked base that has reinforcement pins

Original pins may be

- Iron
- Galvanized Steel
- Bronze
- Copper pipe
- Aluminum

Original pins may be set with

- Lead
- Sulfur
- Adhesive
- Concrete
- Mortar

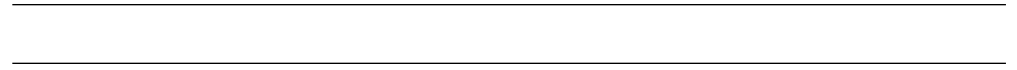
Original pins may be damaged or corroded

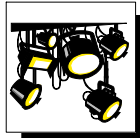
Corroded Pins must be removed!

Replacement pins should be Stainless Steel All-Thread

New pins can be set in

- A soft lime mortar
- Lead
- Setting compound
- Epoxy
- Let free





Closing Remarks and Class Credit

To Receive Credit for this Course

Take the on-line evaluation at

www.nps.gov/training/tel

Click on the DOI Learn tab

Go to the link under Class Evaluations for Essentials for
Cemetery Monument Care

Please complete the evaluation within 2 weeks of the course, by
January 31, 2008.