

Gravestone Conservation

Gravestone conservation is the art of saving and protecting gravestones by performing a set of procedures to stabilize what remains of the gravestone. The idea is to conserve the stone and not try to make it look new.

When exploring old historic graveyards, it is common to see stones that are leaning, fallen, broken and so overgrown with lichens, mold, and algae that they can't be read. Some old graveyards are threatened with a heavy growth of brush and trees. Trees sometimes grow around gravestones, tree roots push stones up or force them to lean.

People concerned with the preservation of historical cemeteries do not like to see gravestones that are broken, leaning or damaged and want to



Wilbor Cemetery,
Little Compton

“fix” them. If you would like to do gravestone conservation work in a cemetery, it is strongly advised to get training.



AGS conservation workshop,
Monmouth, NJ 2012

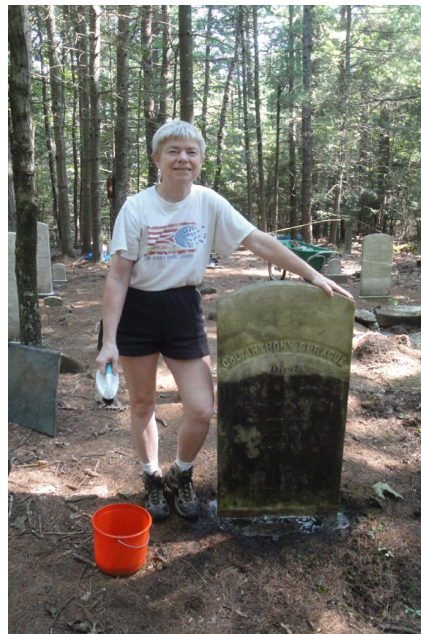
The best way is to join the [Association for Gravestone Studies](#) and attend one of their conferences. A gravestone conservation workshop is part the conference. This is a great opportunity to get hands-on training and learn from the experts so that you learn the correct methods and best materials. The conference is held in June each year in a different state in the country.

Gravestones are outdoor pieces of art. In Rhode Island most of the older stones are made of limestone, marble or slate. Using the incorrect methods and materials on these stones can cause irreversible damage. That means the damage is permanent. There are well-meaning groups and individuals doing work in cemeteries using their own methods and materials causing irreversible damage. Some of the most common misuse of materials is the use of hard Portland mortars to mortar a gravestone into a base or the use of epoxies to fasten a stone into a base. Another is the practice of embedding a gravestone into a wet pool of concrete and the misuse of improper epoxies.

The information on this site is a guide to assist cemetery groups as to the correct methods and materials recommended by gravestone conservation experts but it is NOT a substitute for proper training.

Cleaning gravestones. Before attempting to clean any gravestone, an assessment should be made as to its stability. If the stone is fragile or unstable, it should be left alone.

We recommend the use of D/2 Biological Cleaner <http://d2bio.com>. The stone should be thoroughly wet. Heavy lichen growth can be removed with a plastic scraper before spraying with D/2. After spraying with D/2, let it sit for about 5 minutes before cleaning with a soft nylon brush. Keep a bucket of water handy and dip the brush into the water often to keep the stone wet while you work. The stone should be thoroughly rinsed when done. D/2 is not toxic to humans or the environment. It kills biological growth: algae, lichens, mold; it does not clean staining from tree sap or air pollutants. You will notice that a week after cleaning the stone, it looks better than the day you cleaned it and even better a month later. Stones should not be cleaned too often. Wait at least 5 years or longer before cleaning the same stone again.



Gravestone of Colonel Anthony Sprague before and after cleaning with D/2.
Sprague Cemetery #73, Gloucester

Resetting a tablet. A tablet is a gravestone that is just one piece of stone. They are designed to be set partially into the ground. Usually about 1/3 of the length of the stone should be underground. For step by step instructions, visit the Association for Gravestone Studies website: www.gravestonestudies.org and click on knowledge Center, then click on FAQs. All slate stones are tablets as well as many limestone and marble stones.



Slate tablet of Naomi Brown
Brown Cemetery #2, Burrillville

Setting a stone into a base. In Rhode Island, most of the gravestones that fit into a base are limestone and marble and most of the bases are made of red sandstone, brownstone or marble. The base should be checked first to see if it is level in both directions. If not, it should be made level by packing crushed stone and sand underneath. In many cases, the base is buried and needs to be raised up to proper height. In this case, the base should be dug up and placed to the side. The proper depth hole should be made and then add a bed of crushed stone and sand for drainage. The base is then made level and more crushed stone and sand is packed around it to lock the base in place. The slot of the base should be cleaned as well as the gravestone. The gravestone should be mortared into the base using a high lime mortar. This can be purchased from Limeworks in Pennsylvania at www.limeworksus.com . It can be purchased ready-mixed so all you have to do is add water. When properly mixed, it should not be too wet. Make sure the surfaces are slightly damp and apply about ½” mortar inside the slot in the base along the bottom and up along the edges. Set the stone inside the base and check to see if the stone is level in both directions. Use sturdy sticks on either side to hold the stone upright and add more mortar down into the sides up to the top to create a slanted surface called a “wash” to shed water. The mortar may take a week or more to cure. DO NOT use Portland mortars available at the local hardware store. These mortars are too HARD. If pressure is put against the gravestone, the gravestone will break rather than the mortar joint releasing. Also the hard Portland mortar does not expand and contract with temperature changes and will break away to relieve tension. The joint will fail and the stone will fall again. Since the Portland mortar is harder than the marble, limestone or slate, what remains stuck to the gravestone or base can never be removed, making repairs to the stone very difficult or impossible in the future.



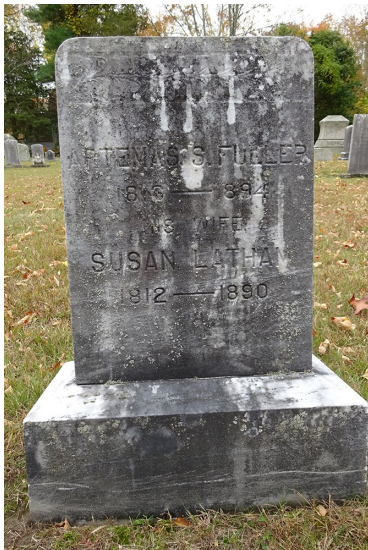
Applying high lime mortar inside slot of a base. Cemetery #29, Burrillville



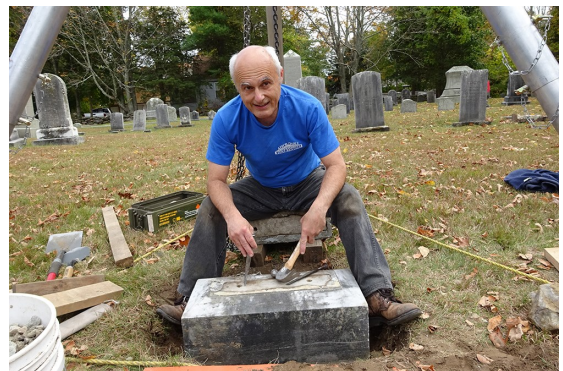
Applying high lime mortar to fasten gravestone to base. Cemetery #93

Resetting Monuments. Most monuments are made out of marble or granite and consist of two or more sections. The main part of the monument with the inscription is called the die. That sits on a base and there can be another base below that. Most of the heavy monuments sit on a foundation stone which is below ground. Before resetting the die, all pieces should be cleaned and the first base must be made level in both directions. The die is set on top of the base using monument compound. This can be purchased at [Miles Supply](#) in Vermont. Also you should position pieces of wedge lead as cushions at the four corners so that the compound doesn't all squeeze out. Trim off any excess that squeezes out. Many monuments have pins in them. Iron pins rust and expand and fracture the stone and damage it. Any iron pins should be removed. If the pins are made of brass or bronze, they should be reinserted. The purpose of the pins is to act as a safeguard so that someday if the stone starts leaning, it won't slide off the base. It does not provide any strength.

Resetting Artemas Fuller monument, Harmony Cemetery, Gloucester



1. Artemas Fuller monument is leaning and ready to slide off the base.



2. Monument is taken apart. Old adhesive is removed. Base is cleaned and leveled.



3. Base is set at proper height.



4. Monument compound is applied to base.



5. Monument is set onto base with tripod



6. Monument compound is trimmed.



7. Artemas Fuller monument is done.

Broken Headstones. Broken headstones can be repaired using special epoxies. We recommend the use of a product made by Akemi called Akepox 2030. It can be purchased at [Stone Boss Industries](#) in New York. DO NOT use any adhesives or epoxies from local hardware stores as they are NOT appropriate for gravestones! First you should make sure you have found all the pieces and they are clean. You should dry-fit them together to make sure they fit. As an example, let's assume that a tablet is broken in two. The bottom piece can be set into the ground to the proper depth. Once that is set, the top piece can be epoxied to the bottom piece. Great care should be taken in the proper mixing and application; a thin film is all that is needed. DO NOT apply to the edges of the stone. NONE of the epoxy should ever ooze out. The top piece can be held to the bottom piece with the use of two pieces of wood positioned vertically held by two wood clamps on either side. If it is very warm in the summer, the epoxy will set quickly, it takes longer when it's cooler. These repairs are best done in the summer when it's warm.



The bottom piece is level and has been set. Then epoxy is applied and the two pieces are joined. They are then clamped together



Stone of Smith M. Thayer, Cemetery #29, Burrillville

After the repair is complete, you are not finished. The remaining crack and imperfections from the break should be patched with a patching material based on natural hydraulic lime. We recommend the use of Lithomex from [Limeworks](#) in Pennsylvania. Non-pigmented Lithomex can be used on marble and you can buy a dark color for slate stones. It can be purchased by the quart. Use only a very small amount and mix it with a small amount of water. It is a little tricky to mix because it is extremely dry and powdery; the water rolls around on the Lithomex instead of mixing with it. You must keep pressing the water into the Lithomex until it is mixed. Make sure the surfaces are slightly damp and using a small craft trowel apply it to the crack, pushing it into the crack as much as possible. It does not matter if you apply too much. Then use a damp sponge, keep wiping the excess away until the joint looks neat and professional.

Epoxy repair of Horace Keach gravestone,
Cemetery #105 Burrillville.
Marble stone is very weathered.



Epoxy repair is complete



Applying Lithomex to
crack



Repair is complete.

For questions or comments, please contact Betty and Carlo Mencucci at bmencucci@verizon.net.

Listed below are Improper Repairs. These techniques are harmful to the stone.



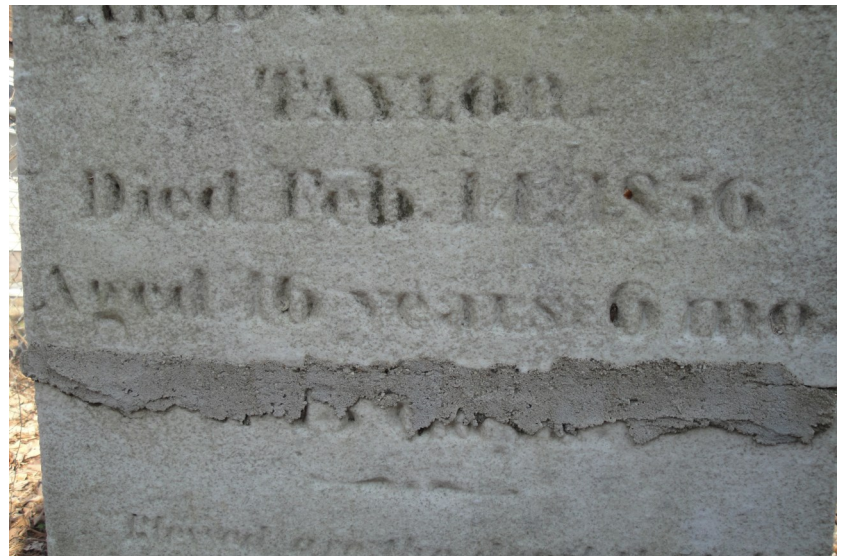
Setting a gravestone into a wet pool of concrete is harmful to the stone.



Unskillful use of caulks that don't adhere properly and repair fails,



Use of hard Portland mortar to repair broken stone. Careless application obliterates some of the inscription. It is impossible to repair this stone correctly because this Portland mortar can NEVER be removed!



Use of hard Portland mortar to repair broken stone. Careless application obliterates some of the inscription. It is impossible to repair this stone correctly because this Portland mortar can NEVER be removed!

Listed below is a suggested list of materials for a group who is interested in starting gravestone conservation work.

Gravestone Repair and Resetting Supplies

Plastic pump sprayer (suggested 1 1/2 gallon size)

Monument setting bar

Epoxy – Akemi akepox 2030 (Stone Boss Industries, New York)

Ecologic mortar mix (F fine), St. Astier natural hydraulic lime (NHL 3.5) –
(premixed) LimeworksUS, Pennsylvania

masonry trowels and pointing tools

2 levels (small and large)

4 adjustable plastic bar clamps

Stone patching material—Lithomex from LimeworksUS

Monument setting compound (gray) – Miles Supply, Vermont

#2 wedge lead (Miles Supply or Granite City Tool, Vermont)

Plastic trowels

Nylon brushes

Plastic scrapers

disposable gloves

1 gallon of D2 biological stone cleaner (Granite City Tool, Vermont)

Hand spray bottle for D2 application

Rubber mallet

Chisels and hammer

Spade shovel

Wooden tamper

Scrap lengths of 2 x 4s and 4 x 4s

Crushed stone (about ¾" and sand) to set tablets and bases.