

# Coast Defense Study Group

## Preservation & Interpretation Committee

### Fortification Preservation Summary Guidelines

Over the past several years owners of former seacoast fortification sites have reached out to the Coast Defense Study Group ([www.cdsg.org](http://www.cdsg.org)), especially our CDSG Representatives, seeking advice key actions they can take to stabilize and preserve the former fortification structures which they own or control. The CDSG has provided detail guide books (produced by NPS and Washington State Parks) that provides the instructions on how best to preserve and restore fortification structures from the masonry era to the reinforced concrete period. While it would be great if these owners followed all the great instructions provided in these manuals, many times their limited resources result in no actions at all. To help site owners focus their limited resources on a few key actions to undertake on a regular basis we have summarized the key guidelines for them below. Please share this advice with your site owners in your local area or when you are visiting these former fortifications. If these actions are not undertaken on a regular basis these structures will become ruins and eventually disappear.

### Landscaping and Vegetation Removal

Roots can cause significant damage to seacoast fortifications by destroying the structure and allowing water penetration. They need to be controlled. Do not pull out roots that have already worked into the structure. Cut large plants at ground level and let the roots deteriorate. Stumps can be treated with an appropriate herbicide. In general, all woody vegetation growing within four feet of a concrete structure should be removed, while all vegetation growing on the concrete or masonry structures should be removed. Woody vegetation larger than four inches in diameter should be removed from all manmade engineered slopes. This also restores the original context of the structure for interpretation.

Ground cover or other native plants help prevent soil erosion. Grass can be used but requires more maintenance and care must be taken with mowing equipment to ensure structures are not inadvertently damaged. In some cases, the army used goats and sheep to keep vegetation down when they controlled these military reservations.

Areas of a structure that were originally earth covered - such as the front of gun batteries – should remain covered. If excavation is necessary for repair or other reasons, the earth should be replaced.

### Structure Maintenance

The focus for this section is on concrete structures, though some advice is also valid for brick and stone. Detailed advice for all types of structures is given in the two manuals mentioned below.

Patching areas where concrete has spalled, been chipped off, or broken loose will prevent water infiltration further into the concrete and further deterioration. Replacement concrete should duplicate the old in composition, strength, color, and texture as much as possible. Detailed patching techniques are given in the *Preservation Handbook* listed below.

Cracks can be either dormant or active. Dormant cracks were caused by shrinkage during concrete curing and are not usually a cause for concern except for water infiltration. Active cracks – those that show movement over time – are the main issue and can indicate serious problems. There are a number of treatment options depending on the size and nature of the crack and the manuals

referred to below should be consulted for further details. Treatment of large structural cracks should be determined by a structural engineer. Infiltration of water is a primary concern, particularly in areas with a freeze/thaw cycle, and steps need to be taken to minimize it.

Deteriorated concrete that has led to exposed metal reinforcement needs to be cleaned and a protective coating applied to prevent further corrosion, or repair/replacement if the structural integrity is threatened; before patching the area. If ignored, corroded metal will spread and break apart concrete.

For external metal parts, do not paint brass, bronze, wrought iron, or cast iron. There are protective coatings that can be used on these. Steel needs to be thoroughly cleaned down to bare metal before priming and painting.

For graffiti, do not use abrasive removal methods or chemicals that may attack the underlying material. The preferred methods to use will vary depending on the method used to create the graffiti. A table in the *Preservation Handbook* details the preferred methods for different types of graffiti.

### **Proper Drainage**

Water infiltration is a major problem. Original drain systems have often failed and should be cleaned out and damaged components replaced with modern materials where they are not visible, such as sub-surface pipes. Damaged areas of concrete where water can collect and pool need to be repaired. Debris and vegetation need to be removed where they contribute to water entering or accumulating in a structure. In general, all steps that can be taken to prevent the infiltration of water into the structure or the accumulation of standing water on the structure will contribute to its preservation.

Creating a waterproof membrane on or in the concrete itself can be done if other methods do not keep it clear of standing water. These types of treatments are covered in the manuals listed below.

### **Sources**

These are only a general summary of some of the recommendations covered in the two manuals listed below. It is strongly advised that they be consulted for further details. They also list a number of other resources with more information on specific topics.

*Historic Fortification Preservation Handbook*, prepared by the Pacific Northwest Preservation Partnership, and  
*Seacoast Fortifications Preservation Manual*, from the Golden Gate National Recreation Area.

Full PDF copies of these are available through the CDSG website on the Preservation and Interpretation page. Some details are also taken from the NPS Cultural Landscape Report for the Sandy Hook Mortar Battery.