

Pooles Island Lighthouse Stabilization Project

Cultural Resource Management at Aberdeen Proving Ground

Located on the northwest side of the upper Chesapeake Bay, Pooles Island is situated at the mouth of the Gunpowder and Bush Rivers in Harford County, Maryland. Constructed in 1825 by master builder John Donahoo of Havre de Grace, Maryland, Pooles Island Lighthouse is the oldest standing lighthouse in the state. The beacon is a conical, land-based masonry tower standing 40' high, with a cast-iron lantern at the top. The original lantern, built of wood with a soapstone floor, was similar to one at Concord Point Lighthouse. The rough cut granite used for the tower was locally quarried in Port Deposit, Maryland. The existing door, believed to be an original, is made out of mahogany. None of the windows remain, and the three openings were bricked in some time ago.

Current Preservation Efforts

Before commencement of the stabilization project, the Pooles Island Lighthouse was in fair structural condition with the exception of some major areas of mortar joint failures and cracks. The poor condition of the joints allowed sand to continually blow into and against the lighthouse. Left unaddressed, the joints would have continued to deteriorate, compromising the integrity of the structure. In order for the lighthouse to retain its architectural integrity, including its overall design, materials, and setting associated with its original 19th-century construction, immediate stabilization actions were imperative.

At the prompting of Aberdeen Proving Ground's higher command who recognized the historical significance of the lighthouse, a major restoration and stabilization project was undertaken by the Cultural Resource Office. This task consisted of several phases: cleaning the structure, logistics, actual stabilization, and visual elements. In adhering to requirements for National Register-eligible properties, all stabilization work met the guidelines as established by the Secretary of the Interior and the National Park Service.

Cleaning and Logistics

Logistics proved to be a challenge: the lighthouse is located on an island several miles from the mainland and there is no access to electricity or fresh water. The Aberdeen Test Center (ATC) was called in to transport a 1200-gallon water tank and all the materials and tools needed for the job. Since a pier only existed at Pooles Island in the mid-to-late 19th century, an all-terrain forklift aboard a barge with a landing ramp maneuvered onto the sandy shore to deliver the items.

Many of the structural aspects of the project were completed in the summer of 1996. Within the Aberdeen Proving Ground (APG) organization, the Directorate of Public Works (DPW) Lead Abatement Team wire-brushed, primed, and painted the cast-iron lantern with a hi-gloss acrylic polyurethane enamel top coat in black. The primer used was a moisture-cured urethane aluminum coating, designed to adhere to rusty metal surfaces. These high quality industrial coatings are designed to resist extreme weather conditions, and should endure for at least five years. The DPW team also cleaned the dark stain around the mid-section of the masonry tower with a phosphate-free detergent, low pressure washer, and scrub brushes. The pressure was set at 1500 psi and increased to 3000 psi at some locations of heavy staining. The rust on the lighthouse was caused by organic residue from the ivy growing on it for many years, algae and mildew buildup, and quite

Since a pier only existed at Pooles Island in the mid-to-late 19th century, an all-terrain forklift aboard a barge with a landing ramp maneuvered onto the sandy shore to deliver all the materials and tools needed for the job. Photo courtesy Aberdeen Proving Ground.



Acrylic panes were installed in the lantern with stainless steel clips and bolts that utilized the existing cast-iron lantern parapet for support.* This method ensured secure installation without alteration of the lantern itself. The existing lantern vents, the operational ventilator ball, and the unsealed acrylic panes all contribute to the positive air flow throughout the lighthouse. Courtesy Aberdeen Proving Ground.



possibly rust accumulation from rainwater dripping from the lantern over a long period of time.

Masonry Tower Stabilization

The actual mortar repair work was performed by the U.S. Coast Guard Reserves Lighthouse Maintenance Unit. Based out of Curtis Bay, Maryland, this 10-member team spent its two-week annual training stabilizing the lighthouse. The active-duty Coast Guard donated personnel and its new “Buoy Boat” to deliver the necessary equipment. After erecting scaffolding and anchoring bowson’s seats onto the lantern, the men opened up the bricked-in windows and began the tedious process of re-pointing the existing mortar. This work consisted of scraping out loose mortar from the joints and replacing it with a freshly mixed mortar that was intended to duplicate the original mortar as closely as possible. The mortar was then softly brushed to even out the seams and provide a uniform appearance. The exterior was not pargeted, as historic photos illustrated that it had never received a smooth stucco finish. One particular area under a window needed extensive repair, as the granite had fallen out and left a gaping hole in the side of the lighthouse.

Components of the mortar included aggregate (sand conforming to ASTM C144), white portland cement (ASTM C150), and lime putty (ASTM C5-79 and ASTM C207)—a new product designed specifically for historic restoration projects. Manufactured by GenLime Group, Niagara Mature Lime Putty is a fully slaked, pure, aged dolomitic lime mined in northwestern Ohio. This ready-to-use putty, when mixed with aggregate, had great workability and plasticity, with enough tensile strength to accommodate structural movement, plus flexibility to absorb normal stresses from winds and vibration. The ratio of materials used was 1:1:6 of lime putty, portland cement, and sand respectively. Appropriate amounts were deter-

mined after consulting with historic preservation experts, following the guidelines provided by GenLime, and assessing the current condition of the granite and weather exposure.

The Coast Guard combined the materials with a cement mixer powered by a generator, as well as by mixing the mortar the old-fashioned way with a hoe and a mud pan. According to the master mason on the team, the resulting mortar was easy to work with and set up nicely. Unlike straight portland and sakrete mortar mixes, the lime putty mortar will prevent efflores-

cence, and its self-healing properties will repair fine cracks that will occur over time. The flexibility of the mortar will also compensate for the inevitable contraction and expansion resulting from weather extremes, protecting the friable granite from further deterioration.

Visual Elements

The DPW Carpentry Shop handcrafted six-over-six double-hung sashes for replacement-in-kind windows. Before the construction of the three pine windows, ventilation was a major concern. This issue was handled by leaving out one top and one bottom pane of glass to facilitate air flow through the lighthouse. From a distance, the open panes are barely visible, and present a more complete image than permanently opening the lower sash. The windows were painted white as historically indicated on a 1910 photograph of the lighthouse.

Vandalism was another consideration before replacing the windows. Pooles Island is off limits to the public at all times, and the area is randomly patrolled by the Federal Marine Police. Nevertheless, the lighthouse has been defaced in the past. One solution was to install ventilated 1/4" acrylic panes directly onto the frame of the wooden windows. These protective panels can be removed at a later date if necessary, and do not significantly affect the overall appearance of the lighthouse.

Acrylic panes were also installed in the lantern with stainless steel clips and bolts that utilized the existing cast-iron lantern parapet for support.* This method ensured secure installation without alteration of the lantern itself. The existing lantern vents, the operational ventilator ball, and the unsealed acrylic panes all contribute to the positive air flow throughout the lighthouse.

After the mortar had cured for over two months, the lighthouse needed the final touches of paint. Tim Hamilton, a local Aberdeen area resident and painter by trade, volunteered his time to paint the lighthouse. Assisted by two Cultural Resource employees, the job was finished in several days. High-quality, Sherwin Williams products were applied to the masonry tower. A heavy coat of Loxon Exterior Masonry Acrylic Primer in white designed to resist efflorescence and prep the surface was applied. The following day, SuperPaint Exterior Latex Flat House & Trim in white was applied using several lambswool rollers. A paint sprayer was deemed unsuitable because of the constant wind on the island and the lighthouse's proximity to the Chesapeake Bay.

Future Plans for the Pooles Island Lighthouse

The only remaining exterior work to be accomplished is replacing the mahogany door. According to Dr. Ralph Eshelman, a consultant to the Maryland Historic Trust, the tongue-and-groove door is identical to the one at Concord Point Lighthouse, and is probably an original. An outline of the iron key box remains on the door, and the cast-iron hinges are still intact. A sizable piece of the lower left-hand side of the door appears to have been scraped and burned away. Plans for the door include replacement-in-kind and sealing the wood with a UV protectant. The original door will be displayed in the Cultural and Natural Resource Visitor's Learning Center. In addition, Terminix of Harford County has volunteered its services to treat the lighthouse for pests.

The interior of the lighthouse is also in need of extensive repair. The exposed mortar is much

softer and more friable than that of the exterior; the joint repairs made by the lighthouse keeper(s) over the years were most likely exterior rather than interior, using more portland cement as it became available. Analysis of the inside mortar reveals only lime and sand, with bits of hair and other materials; no oyster shell was noted. The U.S. Coast Guard Lighthouse Maintenance Reserve Unit has offered their services to the U.S.

Army to repair the interior as one of their weekend drills.

An in-house maintenance team will be organized to check on the condition of the lighthouse periodically. Any minor joint failures and other potential problems can then be corrected on a regular basis. Finally, the U.S. Army would like to relight the beacon as a "private aid to navigation." The Cultural Resource Office is awaiting the required paperwork from the Coast Guard. A plastic Fresnel lens and a solar panel, similar to what is in place at nearby Turkey Point Lighthouse, will be used for illumination.

By implementing restoration projects such as the one at Pooles Island, the U.S. Army Garrison at Aberdeen Proving Ground, in cooperation with the DSHE-ECRD Cultural Resource Program, continues to prove its ongoing commitment to preserve our nation's heritage. The undertaking at the lighthouse demonstrates that in-house cooperation, interagency military coalitions, and community support can work together to get the job done.

Note

* Use of acrylic is acceptable as a temporary protective measure; however, glass should be used as a permanent solution as acrylic breaks down with exposure to UV and salt etching.

References

Goodwin, R. Christopher & Associates, Inc., National Register of Historic Places Nomination Form, 1994.
Spewiek, John P., *The History of Masonry Mortar in America: 1720-1995* (Arlington, VA: National Lime Association, 1995).

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Many of the supplies and much of the labor needed to rehabilitate Pooles Island Lighthouse were contributed by the community. Courtesy Aberdeen Proving Ground.

