

CASE HISTORY:

Historic Lighthouse on Hunting Island, South Carolina

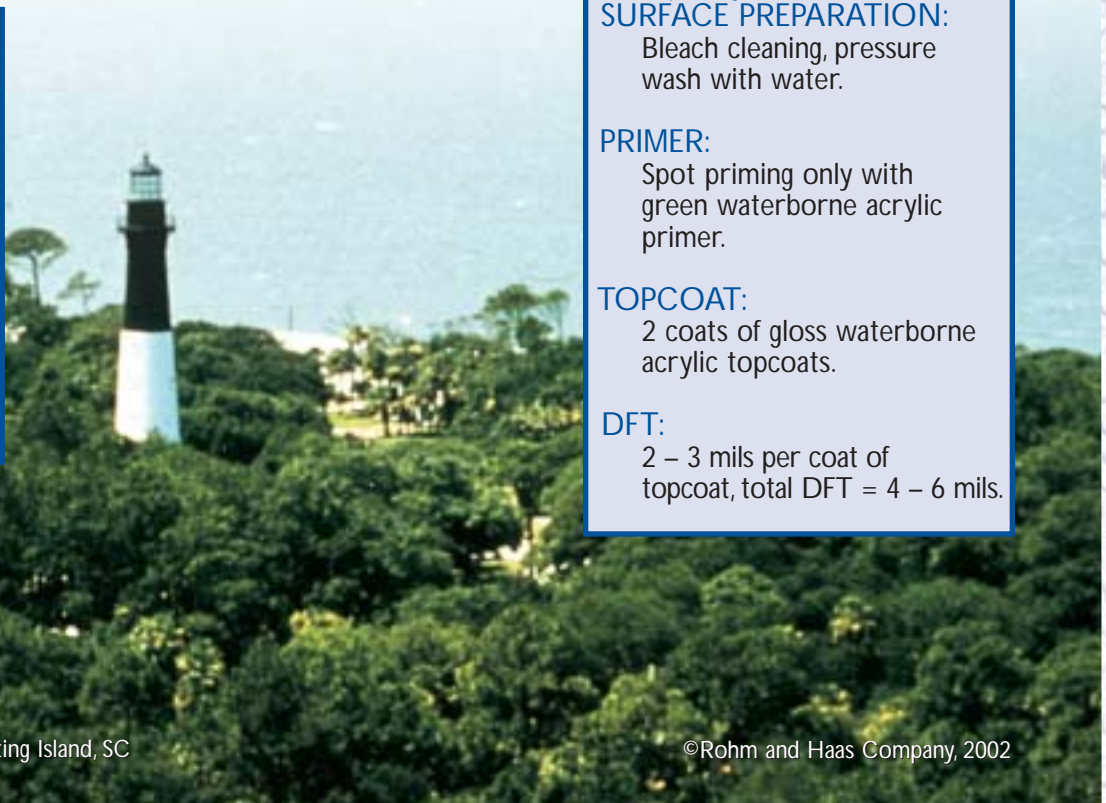
For centuries, lighthouses have assisted mariners in guiding their path through treacherous coastal waters, and in the process have been required to withstand the elements of nature. The environments in which most lighthouses are found can be quite severe, and this is certainly the case for the Hunting Island Lighthouse, located within the Hunting Island State Park in South Carolina. Hunting Island is a barrier island, only four miles long and one mile wide, lying off the coast of South Carolina between Charleston and Savannah, Georgia. The environmental conditions on Hunting Island provide a severe test for any coating system, with steady wind-driven salt spray, high humidity, heavy rains, high temperatures, and bright sunlight.

The substrate used in the construction of the lighthouse is equally demanding of the coating system. The 140-ft high structure is made from 1200-pound cast iron plates that are bolted together to form the outer skin.

In 1981, a Rohm and Haas employee was vacationing on Hunting Island and noticed that the lighthouse was in bad disrepair. There were holes in the cast iron ranging in size from 1/4 to 2 inches in diameter. The alkyd coating that was applied seven years prior had deteriorated badly, embrittling and cracking, especially along the north side. Heavy rust spotting and run-down originating at the plate joints and the pitted areas had turned the once-attractive landmark into an eyesore. A complete restoration was planned.



Lighthouse in 1982 prior to restoration, showing heavy corrosion on northwest side



DETAILS OF PROJECT

Original 1982 restoration:

SURFACE PREPARATION:

Sandblasting to clean metal.

PRIMER:

Red waterborne acrylic primer.

MIDCOAT:

White waterborne acrylic midcoat.

TOPCOAT:

Black (top) and white (bottom) gloss waterborne acrylic topcoats.

Both primer and midcoats contained anti-corrosive pigments.

DFT:

Approx. 3 mil per coat, total DFT = 9 mils.

Second painting in 1993:

SURFACE PREPARATION:

Bleach cleaning, pressure wash with water.

PRIMER:

Spot priming only with green waterborne acrylic primer.

TOPCOAT:

2 coats of gloss waterborne acrylic topcoats.

DFT:

2 – 3 mils per coat of topcoat, total DFT = 4 – 6 mils.

SURFACE PREPARATION & COATING APPLICATION

The first step in the 1982 restoration was to sandblast the cast iron plates back to bare metal. Thousands of holes were laboriously hand-filled using putty knives and an acrylic-modified cementitious compound which was designed to expand and contract with the metal. A red waterborne acrylic primer containing anti-corrosive pigments was applied to the clean steel, and followed by a white midcoat based on the same

acrylic resin. Then gloss waterborne acrylic topcoats were applied to match the historical color scheme – white on the bottom and black on top. The total dry film thickness was approximately 9 mils.



Close-up showing pits and holes in cast iron plates.

PROJECT ASSESSMENT:

By 1993, considerable mildew had formed on the northwest side, where moisture condensation tends to collect and run down the shaded portion of the lighthouse. In addition, the topcoats had completely lost their gloss. However, after eleven years of service, the coating system was intact and there were no significant signs of corrosion, except for a few spots of rusting where the plates meet. In order to restore the gloss and rid the structure of unsightly mildew, it was decided to repaint the lighthouse in 1993. Surface preparation this time was kept to a minimum. A thorough cleaning with bleach followed by pressure washing

with water was done to remove the mildew. A waterborne acrylic primer was applied by brush only where needed, and then the tower was finished with two coats of a waterborne acrylic gloss finish, at an average dry film thickness of 4-6 mils.

The Hunting Island Lighthouse was recently inspected in March of 2002. Overall, the lighthouse is in excellent condition. Only a few small rust spots were observed on the entire structure. The lower white section has chalked considerably, while the upper black section is doing very well with high gloss and no chalking. A small amount of mildew has once again started to

grow on the northwest side, but could probably be easily remedied with a bleach cleaning and pressure washing. Today, after twenty years of service, waterborne acrylic coatings are still protecting the Hunting Island Lighthouse from the elements, and provide an aesthetically pleasing exterior for the more than 1 million annual visitors to the Hunting Island State Park. After 127 years, this historic landmark deserves nothing less.



One of the few corrosion spots observed on lighthouse in 2002. This spot occurred at one of the plate seams.



Lighthouse in March of 2002.