

Museum Makes USS Yorktown Shipshape

By Lori R. Huffman, JPCL



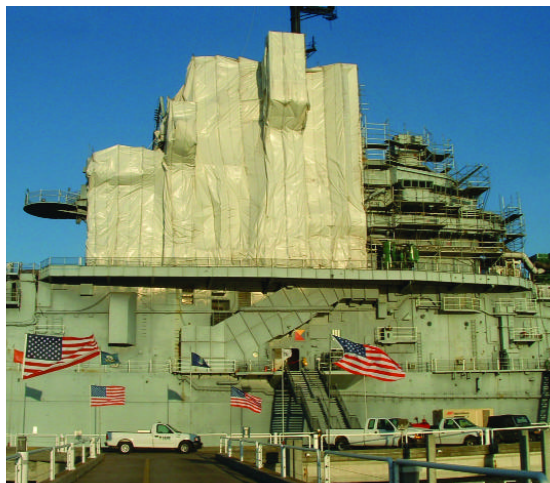
The USS Yorktown is recapturing some of its glory with rehabilitation projects aimed at removing many layers of failing coatings from the 63-year-old aircraft carrier and replacing them with coating systems that will preserve part of America's history. The Yorktown was launched January 21, 1943, and after serving in World War II, the Korean War, and the Vietnam War, the ship was decommissioned and dedicated as a memorial on October 13, 1975. The Yorktown has since resided at Patriots Point Naval and Maritime Museum in Charleston, SC, serving as one of the museum's exhibits.

According to Bob Howard, Director of Operations for the museum, the Yorktown's coatings had deteriorated, exhibiting rusting and patches of delamination. The consulting engineers hired to perform the condition assessment reported that the thickness of the

existing coatings was so great that overcoating was out of the question, says Howard. The consulting engineer recommended total removal of the coatings, which also contained lead. The museum plans to repaint the entire ship, says Howard, but has built into the contract enough flexibility to complete the project in segments as funding is available. The museum expects to finish the rehabilitation in five years, working from the mast to the hull.

Environmental and Public Health Concerns

Because of the presence of lead paint on the Yorktown, which sits in the Charleston Harbor, the museum had to take precautions against emissions from the project. The consulting engineer, therefore, wrote the specification to require total containment, along with air monitoring, waste testing, and proper waste disposal.



Complex containment for renovating and preserving the Yorktown. Photos courtesy of S&ME Inc.

Public Use, Weather Complicate Project

Ensuring public access to the Yorktown during the rehabilitation was a critical priority for the museum, which is open year-round, says Howard. The museum and the contractor worked in close coordination to plan access routes for museum guests and to minimize closed areas. "Being a ship, there's a limited number of passageways people could go through," he says. In one instance, the contractor built a tunnel under the containment so that museum patrons could walk out on the flight deck, says Mike Pilley, vice-president of Phillips Industrial Services (Goose Creek, SC), the coating contractor.

The possibility of tropical storms and hurricanes added further difficulties to the project, says Howard. The containment on the masts alone had to be rebuilt six times during the work due to high winds, he adds. "The weather was very challenging," says Pilley. "We never knew if the deck would have condensation on it. We had short parameters as to when we could work. On a cloudy day, it took longer for moisture to evaporate. We'd blow the deck down to dry it." In addition, the steel temperatures could reach as high as 150 F (66 C), necessitating the use of a different thinner or the end of work, he says.

Mast and Superstructure

To date, the painting contractor has finished work on the mast and superstructure (comprised of 11 stories atop the flight deck). Beginning April 12, 2004, and working over nine months, the painting contractor abrasive blasted and coated the starboard side of the superstructure, the mast, and the port side of the superstructure, says Pilley.

According to Pilley, the scope of the project included scaffolding and working with the ship's crew to remove unnecessary protrusions (such as sharp burrs on the metal substrates and even

Continued

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old metal speakers) and to replace some of the metal to prolong the life of the new coating system. Erecting containment, pressure washing, abrasive blasting, and applying the three-coat system were also included in the scope.

A subcontractor to the coatings contractor erected the tube and clamp scaffolding and the containment, which

used impenetrable tarping. The contractor used a 40,000 cfm dust collector to provide ventilation during abrasive blasting.

The contractor pressure washed the steel (with 3,000 psi [200 bar] pressure), using a chloride treatment to remove chloride contamination. Following washing, the contractor used

recyclable steel grit for abrasive blasting. The specification required a surface profile of 2 to 3 mils (50 to 75 microns), says Pilley. The contractor prepared the vertical steel surfaces to an SSPC-SP 6, Commercial Blast. Horizontal surfaces, where water might pool, were abrasive blasted to an SSPC-SP 10, Near White, finish. Pilley notes that workers wore air-purified blasting hoods while abrasive blasting and half-mask respirators with organic vapor cartridges while painting.

Workers applied an organic zinc-rich epoxy primer to a 3- to 5-mil (75- to 125-micron) thickness using airless spray. A stripe coat of a polyamide epoxy, followed by a 5- to 8-mil (125- to 200-micron) coat of the same material was then applied. The contractor then applied a 3- to 5-mil finish coat of aliphatic acrylic polyurethane.

Flight Deck

The contractor finished work on the flight deck of the Yorktown in January 2006, says Pilley. The wooden deck had been coated many times, and water leaked through the deck into the hangar bay level when it rained, he says. The museum had the center portion of the deck replaced with steel, and the contractor began work in July 2005.

To achieve the specified SSPC-SP 10 finish and minimum 2.5-mil (62-micron) profile, the contractor used mobile centrifugal wheel blasting. The contractor then applied 3 mils (75 microns) of a high-solids zinc-rich epoxy primer by airless spray, an epoxy polyamide stripe coat, and two full coats of epoxy polyamide (2 to 3 mils or 50 to 75 microns each) by rolling. Aluminum oxide grit was broadcast into the wet epoxy polyamide coating to provide a non-skid texture, says Pilley. The contractor then rolled on two coats of an aliphatic acrylic polyester urethane to a thickness of 2.5 to 3.5 mils (62 to 88 microns) each.

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Approximately 50,000 sq ft (4,500 sq m) of the flight deck was coated.

Inspection

The consulting firm employed by the museum provided two inspectors on the jobs. One, a NACE-certified inspector, conducted weekly site visits and handled the technical issues related to coatings, and another conducted daily job site inspection, including environmental monitoring, says Jim Killingsworth, Manager of Environmental Services for the consultant.

The consultant carried out air monitoring, inspected the containment and scaffolding, and monitored the surface preparation and coatings application. As a part of its quality control measures, the contractor had its workers' blood lead levels monitored and performed personnel air monitoring, Pilley says.

According to Killingsworth, there were no measurable emissions from the containment, despite the incidents of high winds.

Results

Of the Yorktown's new look, Howard says "We've been very pleased," adding that "the part of the ship that's been completed looks beautiful. It shows the public that we are making progress and that we are trying to restore the ship."

Killingsworth praises Patriots Point Naval and Maritime Museum for its effort to preserve part of American history, and credits both the contractor and the museum representatives for the spirit of partnering that ultimately made the jobs successful.

At press time, the work on the flight deck was complete, and plans were underway to begin work on the hull. The museum hopes that the rehabilitation will be finished within three years, says Howard.

Phillips Industrial Services, an SSPC-certified contractor (OP 1, OP 2, and OP 3), performed the abrasive blasting and

repainting of the Yorktown. Patent Construction Systems (Jacksonville, FL) built scaffolding for each phase of the project. Eagle Industries (New Orleans, LA) provided the tarps for the containment. Chlor*Rid International Inc. (Chandler, AZ) manufactures the chloride treatment. The Sherwin-Williams Company (Cleveland, OH) provided the

zinc/epoxy/urethane system for the mast and superstructure. Carboline (St. Louis, MO) manufactures the zinc/epoxy/urethane system applied to the flight deck. S&ME Inc. (Raleigh, NC) performed the initial coatings assessment, design, specification, project management, and environmental and coating inspection.



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