

STEEL MARINE ACRYLIC

Making History: Recoating a World War II Aircraft Carrier

BY **CLAIRE TRAGESER**
PHOTOS COURTESY OF **PATRIOTS POINT NAVAL &
MARITIME MUSEUM**

Many coatings projects are done on buildings with history, but it is not very often that a job calls for coatings on something that was part of multiple battles during World War II. A crew at the Patriots Point Naval & Maritime Museum in Mt. Pleasant, S.C., is getting to do just that.

Live History

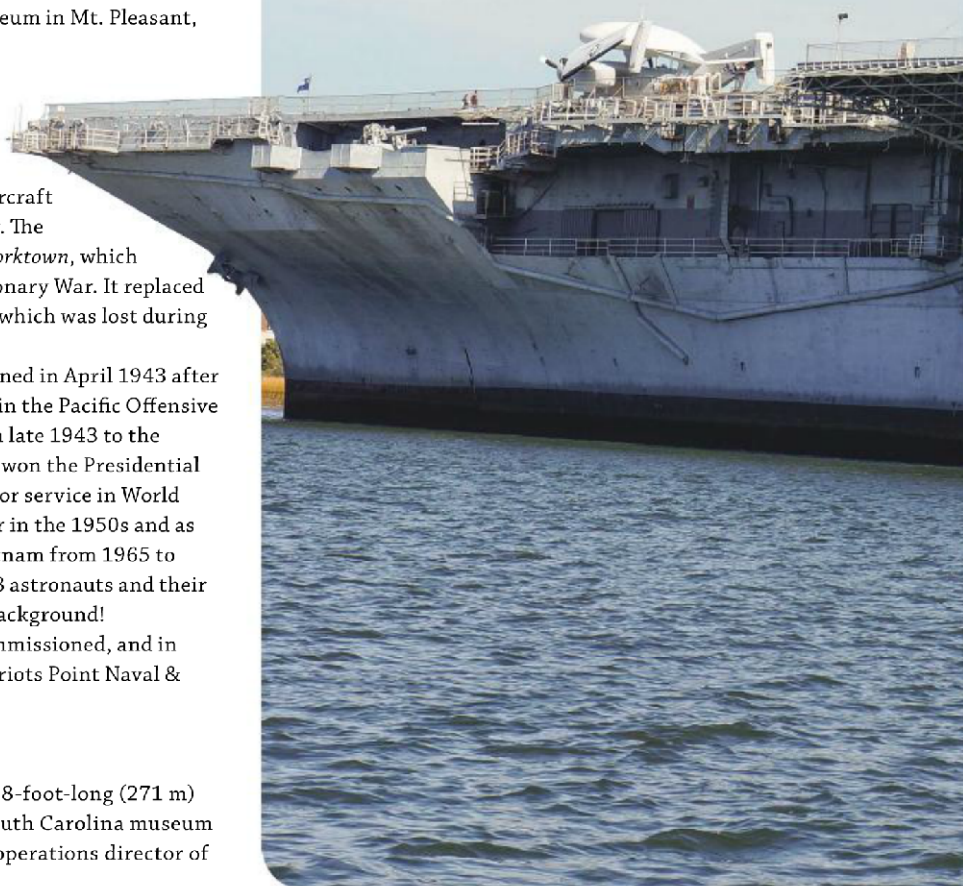
Stationed at the museum is the *USS Yorktown*, one of 24 aircraft carriers built during World War II and the 10th aircraft carrier to serve in the United States Navy. The *Yorktown* was named after the Battle of *Yorktown*, which took place during the American Revolutionary War. It replaced another ship (also named *USS Yorktown*), which was lost during the 1942 World War II Battle of Midway.

This *Yorktown* carrier was commissioned in April 1943 after just 16 months of construction. It joined in the Pacific Offensive during World War II, which spanned from late 1943 to the end of the war in 1945. The *USS Yorktown* won the Presidential Unit Citation and earned 11 battle stars for service in World War II. It then worked as an attack carrier in the 1950s and as an anti-submarine aircraft carrier in Vietnam from 1965 to 1968. The ship also picked up the Apollo 8 astronauts and their capsule in 1968. This ship has quite the background!

In 1970, the *USS Yorktown* was decommissioned, and in 1975, it was towed to its new home at Patriots Point Naval & Maritime Museum.

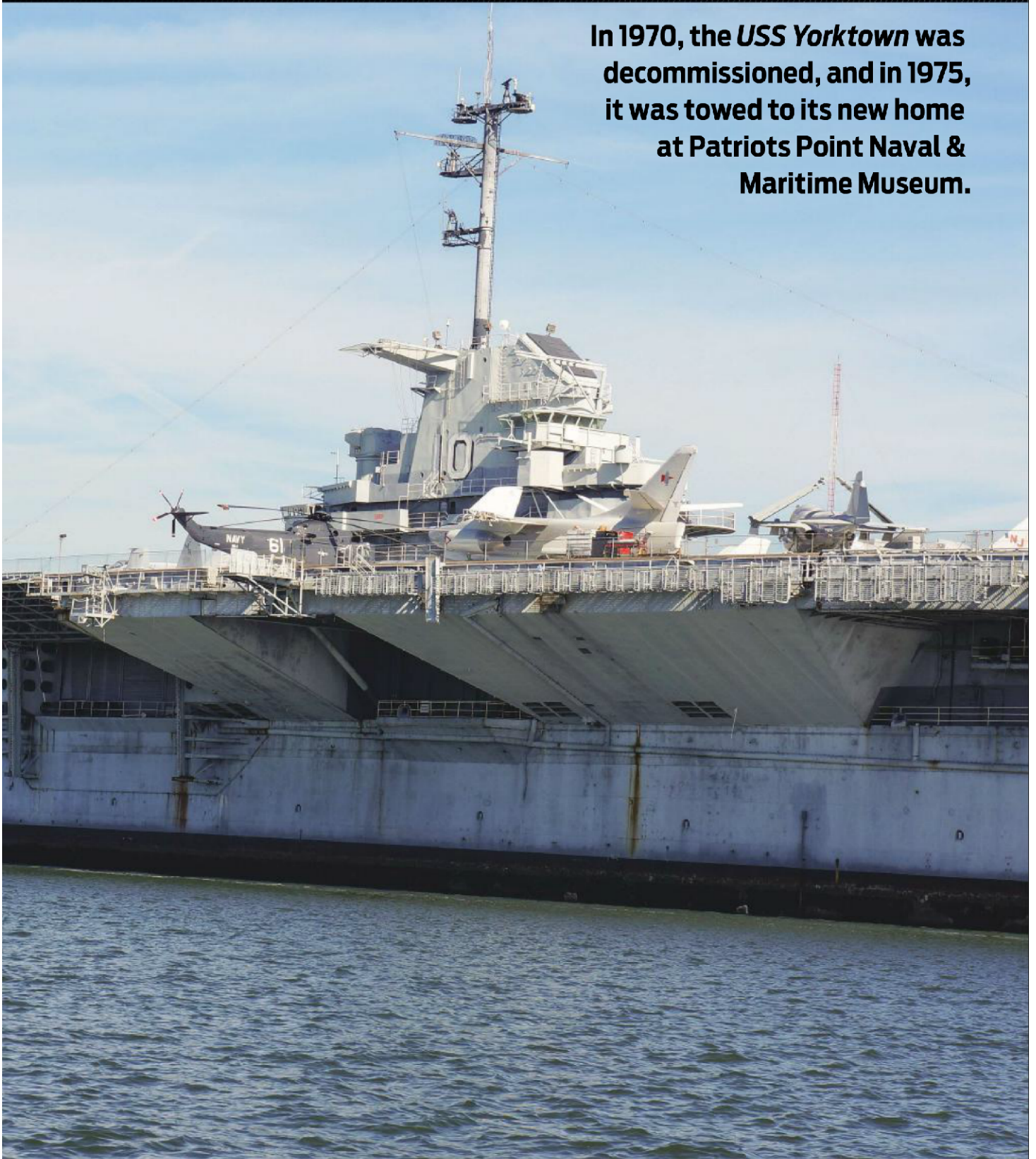
Recoat on Water

The 40,000-ton (36,287 metric tons), 888-foot-long (271 m) vessel has been the centerpiece of the South Carolina museum since it got there, said Bob Howard, the operations director of the museum.



World War II Aircraft Carrier

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Commissioned in 1943, the *USS Yorktown*, which now sits at the Patriots Point Naval & Maritime Museum, needed an overhaul of its carbon steel. It's had a varied past and needed a variety of repairs.

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Because the recoating of the hull was to be completed over water, the museum's crew first needed to figure out how to adhere to environmental regulations for removing the old and applying the new coatings.

"She was decommissioned from the Navy in 1970 and sat in mothballs for a while, then was donated to South Carolina in 1975 to be part of the museum," Howard said. "She's been open to the public ever since — 364 days a year. She gets about 300,000 visitors a year. People love coming to visit." (The only day they're closed is Christmas.)

But while the *USS Yorktown's* history is what makes it special, it also means the vessel has seen a lot of wear and tear. And as its time at the museum accumulated, Howard became more and more aware that the ship would need a recoat.

"We've known for some time that she needed to be painted, but that comes with a lot of challenges," Howard said. "Because of the ship's age, she has a lot of old coating systems on her and is coated with lead. That makes it more difficult to do the job, especially over water." That's because there are tight restrictions about how the museum must get rid of the old coating to make sure none of it pollutes the water below. And the environment wasn't the only hurdle on this job.

The crew started by scraping off the many old layers, flakes, and blisters, of paint using a dull paint scraper. The two- to four-person crew carefully collected and disposed of the waste.



JOB AT A GLANCE

PROJECT:

Recoat the hull of a World War II aircraft carrier called the *USS Yorktown* in South Carolina

COATINGS CONTRACTOR:

Patriots Point Naval & Maritime Museum
40 Patriots Point Rd.
Mount Pleasant, SC 29464
(843) 884-2727
www.patriotspoint.org

SIZE OF CREW:

2–4 people

PRIME CLIENT:

State of South Carolina
1301 Gervais St., Suite 710
Columbia, SC 29201
(803) 771-0131
www.sc.gov

SUBSTRATE:

Carbon steel

CONDITION OF SUBSTRATE:

Used; covered by as many as 8 layers of various coatings applied over several decades

SIZE OF JOB:

50,000 sq. ft. (4,645 m²)

DURATION:

2 years

UNUSUAL FACTORS/CHALLENGES:

- » Environmental regulations meant old paint had to be carefully scraped off and collected
- » Working for a nonprofit museum meant budget was limited
- » The substrate was historic, so it wasn't known what was in each layer of coating
- » All work was done outdoors, so weather conditions had to be considered

MATERIALS/PROCESSES:

- » Carefully scraped off old paint using a dull paint scraper; the material is collected and disposed of as hazardous waste
- » Worked on a man lift to access the curved exterior
- » Used CHLOR*RID to clean the surface
- » Applied Rust-Oleum's ROC Prime 100 primer at an average wet film thickness (WFT) of 2–4 mils (51–102 microns)
- » Rolled on two coats of Rust-Oleum's Sierra Performance MetalMax, a water-borne acrylic, to reach a total average WFT of 2–4 mils (51–102 microns)

SAFETY CONSIDERATIONS:

- » Wore life jackets and harnesses at all times when they were over water and on the lift
- » Wore face shields, safety goggles, and gloves during the preparation process and painting

World War II Aircraft Carrier



The crew worked from a barge with a 2-ton (1.8 metric tons) man lift. Even with the lift, getting access to all of the nooks and crannies on an angled surface has been a challenge.

“The hull was looking pretty bad, but we couldn’t spend the millions of dollars we’d need to blast down to sheer metal,” Howard said. “But we needed to do something because the paint was blistering and flaking off the sides of the ship, so we needed to do something about it. We met with environmental regulators and talked about our options, what we could and couldn’t do within our capability. We’re a state agency, so we don’t have the people who have the kind of expertise needed to take this down to bare metal. But by working with the regulators, we came up with a process where they would allow us to gently scrape material off the side of the ship, capture that material, and dispose of it as hazardous waste. Then we’d apply a primer and topcoat on top of the old paint. Of course, it’s not an ideal situation because I’d love to be able to get all the old paint off.”

But Howard made the best of his options. A crew of between two and four men are slowly and painstakingly scraping off the old paint and collecting everything they scrape off to make sure it does not touch the ocean waters. And although the ship is owned by the state of South Carolina, it’s the Patriots Point crew that has been working on the recoat in-house. Howard said he expects the job will take a couple of years to finish.

Special Tactics

The crew has been relying on a specific product called CHLOR*RID to get the job done. Howard said the crew cleans the ship with a very low pressure wash of CHLOR*RID solution, which helps remove the salt from the side of the ship.

“Obviously, the ship is sitting in a salt water harbor, so we needed to get salt off the side before we could paint it,” Howard said.

CHLOR*RID offers tests to see how many parts per million of chlorides, sulfates, or nitrates are on the surface of what needs to be cleaned, said Robert Richter, the southeastern regional manager of the company.

“The soluble salt absorbs moisture and causes corrosion,

even out of the paint,” Richter said. “We test to see the levels of the soluble salts, then add the product to water and power wash, and it brings the salt in solution with the water and rinses it off the surface. So when they paint, it makes the coatings last 10 to 15 years longer.”

“They were very interested in the product, because with limited maintenance money, it will have their coatings system last longer,” Richter added. “That’s why they used our product.”

Richter said the museum’s interest in CHLOR*RID offered his company a chance to do the right thing. “Since it’s a charitable organization; we decided we would donate the product instead of charging them for it,” he said. “They’re self-supported on whatever money they take in from tours, so we decided to donate because that would help them out a little bit.”

Richter has been to the jobsite several times during the process and said the CHLOR*RID product has been working great. “They’re limited on what type of surface preparation they can do, being right on the water, so our products help them do the best job they can with the type of surface preparation they’re doing,” he said.

Richter said his company is glad to have the opportunity to help out, especially on a project that is focused on veterans. “Most of the people in our company are veterans, and it’s just one way we can give back,” he said. “It’s a piece of history that represents a time a lot of people don’t get to experience today. Back in the 1940s, ’50s, and ’60s, we all were going to different wars, but it’s not like that today. So they bring school kids in there and have camps where kids stay on the ship like the old sailors did. It’s a piece of history.”

Howard said the CHLOR*RID has been working well to help clean the substrate. After the surface is as clean as the crew can get it, the crew applies ROC Prime 100, a primer from Rust-Oleum, at an average wet film thickness (WFT) of 2 to 4 mils (51–102 microns). They follow that with two coats of Rust-Oleum’s Sierra Performance MetalMax, a water-borne acrylic urethane.

Before the coatings could be applied, the crew needed to prep the steel hull. This included cleaning with CHLOR*RID and a pressure washer to help remove the salts on the side of the ship.





The first of two coatings was the primer, which was applied at of 2–4 mils (51–102 microns) wet film thickness (WFT) from the ship's bow, down the starboard, and to the port.

Howard selected this coating system after talking with other museums that have old aircraft carriers. “Within the historic naval system, we talk to each other, and a museum in Oakland had used it and was very happy with it,” he said.

Howard said one of the advantages of the primer was that it could be applied on top of a broad range of substrate coatings. “We don’t really know what all those coatings are and what they contain and how old they are, so we needed something to encapsulate the whole thing and then we could put a fresh topcoat on,” he said.

The crew applied the coating in two layers to reach a total average WFT of 2 to 4 mils (51–102 microns) using rollers. “We didn’t spray; we had to apply with rollers because that was part of the process the regulatory agencies said we needed to use,” Howard said.

The crew started at the bow of the ship and began working down the starboard side. They use a barge with a 2-ton (1.8 metric tons) Nifty TM50 man lift, which allows the workers to be able to reach up on the side of the ship that they need to do their work. Once they are finished with the starboard side, they will bring the barge back to the front and do the port side. The crew uses tarps draped between the *Yorktown* and the barge to make sure none of the chips of paint they scrape off land in the water. When they are done, they will have resurfaced 50,000 square feet (4,645 m²) of carbon steel.

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World War II Aircraft Carrier



The crew roller-applied two layers of the topcoat to reach a total average WFT of 2–4 mils (51–102 microns). As Bob Howard, the museum's operations director, explained, they couldn't spray due to regulations.



The crew wore harnesses at all times when working over water and on the lift. They also wore face shields, safety goggles, and gloves when necessary, such as during the surface prep.

Battening Down

While the man lift works well, it has been a challenge to get the crew access to the surface, Howard said. "They need to be able to work at different heights and reach all kinds of little nooks and crannies," he said. "The ship is not a vertical surface — it slopes and curves in many places — but the man lift allows them to get in all of those places and do the work they need to do."

For safety, the crew wears life jackets and harnesses at all times when they are over water and on the lift, Howard said. All employees were also trained in using the proper personal protective equipment at all times, including face shields and safety goggles during the preparation process and painting, and gloves when needed to avoid skin contact with products being used.

The weather has also been a challenge because the crew is completely exposed to the elements. And as the weather cools, the crew sometimes has to wait for the surface to heat up so the

coating can be applied. But the results look "fantastic," Howard said. "The difference between before and after is very noticeable," he shared. "Before, the paint was blistering and flaking; there was discoloration, a range of grays, and areas that were faded — no continuity. It really looked bad."

And now?

"It's one nice smooth, continuous gray surface," Howard said. "It probably isn't that exciting to many people, but to those of us who work with ships, it is. It's very satisfying, because we've known for some time the job needed to be done. We think a great deal of the vessels we have here. We want to respect them, do right by them."

Serving the Ship

Howard said when the job is done, he will feel like he has served a ship that served this country so well for so long. "She didn't look very good, and [she's] so much better now," he said. **CP**

As Howard said, "It probably isn't that exciting to many people, but to those of us who work with ships, it is...We want to respect them, do right by them." And that they have!



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