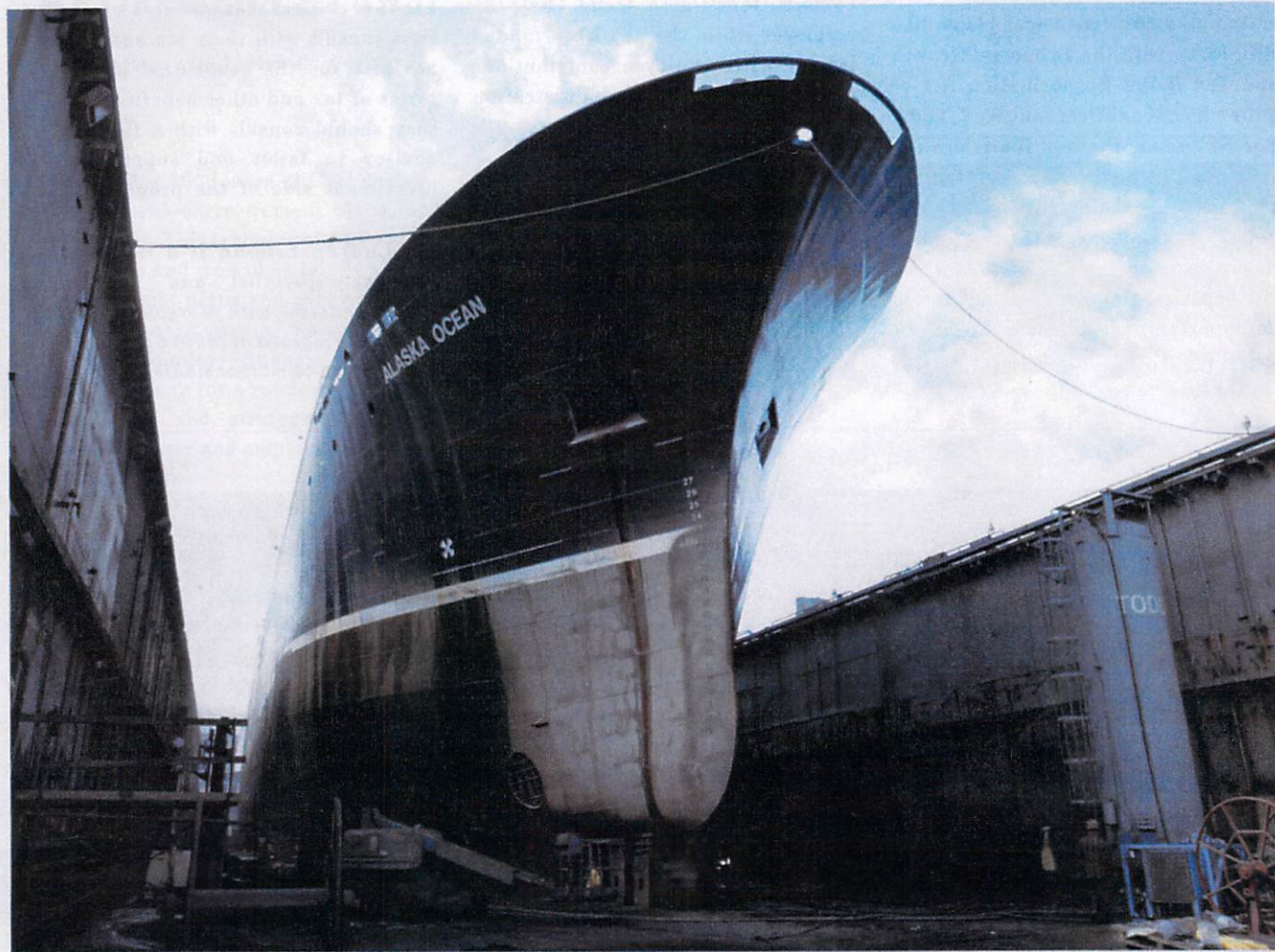


From Stem to Stern:
Polyurea Hits the Deck to Make a Fishing Trawler's Floor

Shipshape

By *Eric J. Bosanac*
of *Sherwin-Williams*



For thousands of years "men have gone down to the sea" in ships, but only within the past 150 years have the ships been made of steel and been driven by mechanical power. Since then, the maintenance of seagoing vessels has become a very demanding, multi-skilled, and competitive job.

The 376-foot-long *Alaska Ocean* is one of the largest and most sophisticated fishing vessels in the U.S. The huge trawler/processor churns

through the chilly, blue-gray waves of the North Pacific Ocean and the Bering Sea, harvesting and processing Alaskan pollock and Pacific whiting to produce surimi, the imitation crabmeat that is made from minced, washed, and frozen pollock.

Representing a \$60 million investment for her owners, Alaska Ocean Seafoods, the trawler has the capacity to harvest and process more than 500 metric tons of fish per day during each

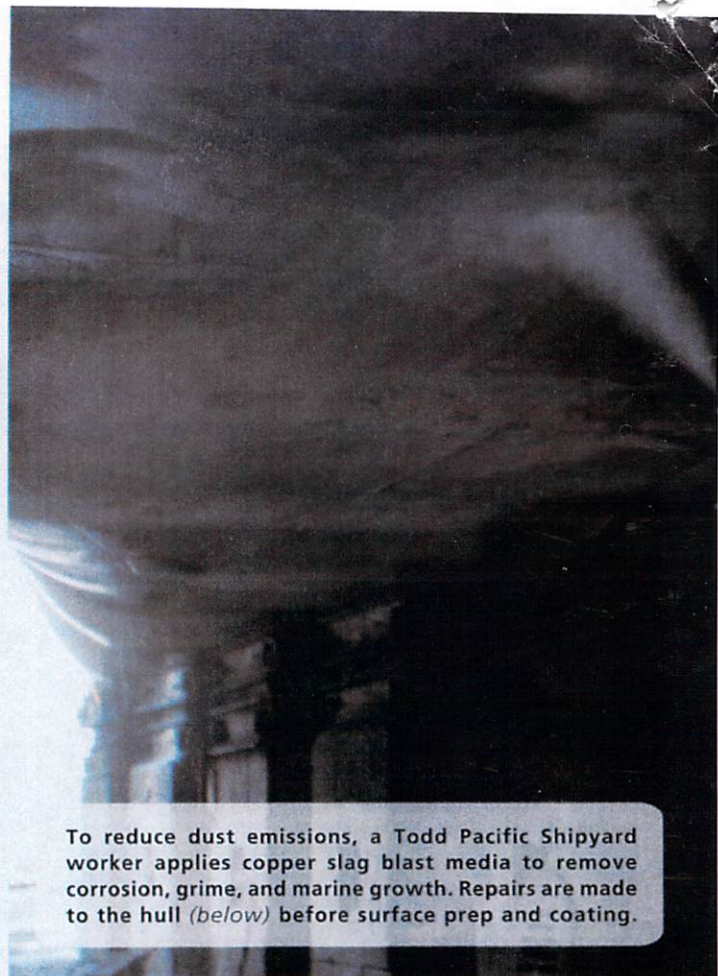
A Floating Factory at a Glance

Processing at sea allows Alaska Ocean Seafoods to offer the freshest possible products. Its fleet of fishing vessels includes the *Aurora*, *Auriga*, and *Alaska Ocean*.

With a crew of 120 to 150 persons and operating 24 hours per day, seven days per week, the *Alaska Ocean* boasts a full-service galley set up buffet-style with seating for about 70, laundry service, an on-ship store, an exercise and weight room, an infirmary, and a crew lounge. Most of the sleeping accommodations are multi-person state-rooms with private baths. Heating, ventilation, and air conditioning are provided by a complex dual duct HVAC system.

The surimi-processing area occupies about 14,000 sq. ft., while the fishmeal plant requires two deck levels of about 3,000 sq. ft. The vessel also contains cargo holds for storing finished products.

The engine room houses not only the main engine, but also three generators that provide 4,500 kilowatts, primarily for refrigeration, hydraulics and lighting. Since surimi production requires vast amounts of fresh water for the washing process, much of the ship's engine room is devoted to the water-maker used to produce fresh water from seawater. The vessel's steam boilers and exhaust boilers also take up a significant amount of engine room space. The *Alaska Ocean* carries enough fuel – about 450,000 gallons – to remain at sea for about 45 days at a time.



To reduce dust emissions, a Todd Pacific Shipyard worker applies copper slag blast media to remove corrosion, grime, and marine growth. Repairs are made to the hull (*below*) before surface prep and coating.

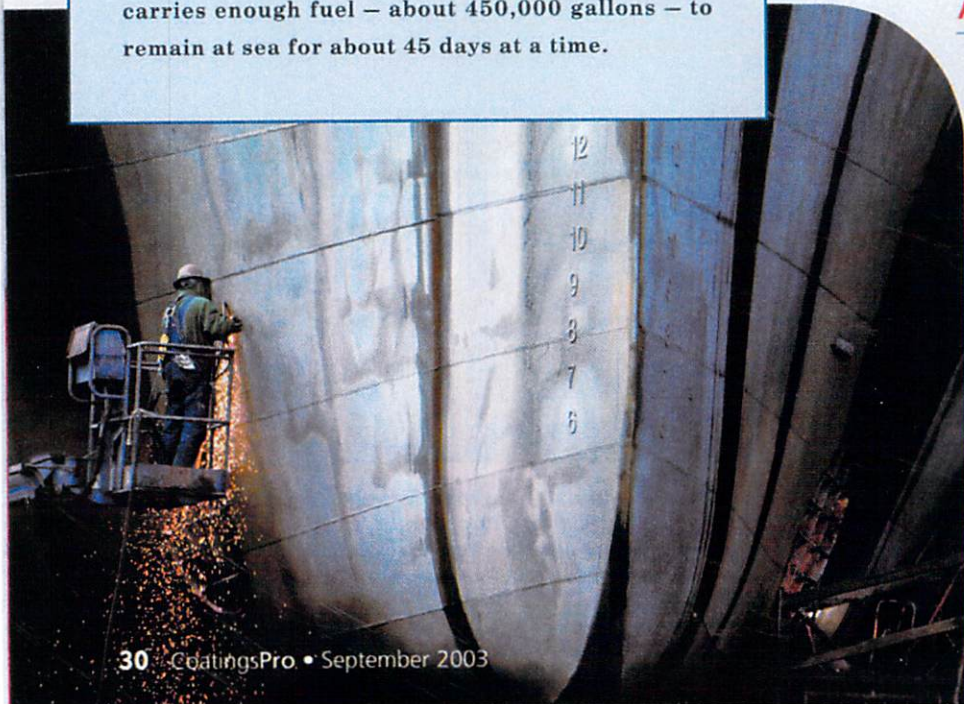
of the approximately 220 days per year she spends at sea. But when she is in dry dock, the pressure is off the fishermen and shifted to the shipyard workers, who battle the effects of the high seas and return her to shipshape.

According to Cory Kaldestad, the *Alaska Ocean*'s port engineer who oversees vessel maintenance, the dry-dock period is an important time for performing functions that also keep the trawler in compliance with various government requirements and regulations.

Anything but Idle

Violent weather, powerful waves, and constant salt spray encountered by the *Alaska Ocean* take their toll on the vessel. This spring, she underwent a two-month dry dock period packed with activity at Todd Pacific Shipyard's 46-acre, state-of-the-art dry dock facility in the Puget Sound.

Todd Pacific Shipyard has a long and colorful history. Through eight decades and three generations, the talented craftsmen have passed along their skills and ingenuity. Perhaps that's why the crews were undaunted when faced with an aggressive dry dock agenda for the *Alaska Ocean* that went something like this: Inspect rudder and tailshaft; upgrade fishing gear, fish-finding equipment, and factory process systems; perform maintenance on engines and various





JOB at a GLANCE

PROJECT:

Alaska Ocean fishing trawler/processor: Dry docking for underwater hull coating applications. Docksides for maintenance, painting, equipment installation, and inspection.

COATINGS CONTRACTORS:

Todd Pacific Shipyards Corporation
Harbor Island
1801 16th Avenue, SW
Seattle, WA 98124
(206) 623-1635

SIZE OF CONTRACTOR:

35-37-person paint team
(750 total yard employees)

PRIME CLIENT:

Alaska Ocean Seafood L.P.

SUBSTRATE:

Steel

SIZE:

376 ft. fishing vessel

DURATION:

Two months without interruptions

SUBSTRATE CONDITION:

Good with several areas
of severe corrosion

UNUSUAL FACTORS:

Need to contain dust emissions. Repairs and equipment installation work performed at same time painting team applied the Sherwin-Williams EnviroLastic Polyurea. Built a tent to keep the deck dry while spraying polyurea. Endured several days of wind and rain.

MATERIALS / PROCESS:

- Power-tool-prepared freeboard and topside structure with sanders and needle guns
- Spot-blasted freeboard to SSPC SP-6 and sweep-blasted to SSPC SP-7
- Used copper slag blast media with water ring on underwater hull
- Sandblasted deck and railing to SSPC SP-10 with Sponge-Jet system
- Sprayed EnviroLastic AL 450 SS polyurea on steel decks and railings

SAFETY CONSIDERATIONS:

- Personal Protective Equipment used such as: coveralls, face shields, full-face respirators, and gloves

engine room and vessel systems; and provide a quality paint job.

The unusual aspect of this dry dock work was the extensive use of polyurea. Polyurea coatings are coming into wider use across many industries, and the marine market is no exception. Above the water line and below, these coatings can be very effective in protecting steel, aluminum, and fiberglass in areas ranging from decks to hulls and for fish hold liners and bilge liners. Amazingly, the coatings cure in as little as 30 seconds.

Previously, Kaldestad had arranged for a test area of Sherwin-Williams EnviroLastic Polyurea to be applied and tested on the trawler for one fishing season. It had performed quite well, so Kaldestad was enthusiastic about trying the coating on deck areas.

Ray Meador, marine specialist at Sherwin-Williams Industrial and Marine Coatings group, says polyurea coatings are ideal for marine applications for many reasons, including the need for fast job turnaround in dry dock to keep upgrades and repairs on schedule.

"Polyureas hold up where other systems will fail," Meador notes. "The fact that polyurea coatings are not sensitive to moisture and humidity during curing means they can be applied within a wider window of temperatures and weather conditions than traditional coatings. They're an excellent choice when fast curing applications are applied in high-humidity or low-temperature conditions and where extreme abrasion resistance and a high film build are required," he says.

Charting New Waters

Pete Judt, paint department head for Todd Pacific Shipyards in Seattle, and Ricky Roust, composite crew assistant

foreman, have a combined total of more than 55 years of marine painting experience. They were aware that they were charting new territory, however, by applying polyurea to a marine vessel.

"The application of polyurea is new to ships," says Judt. "There aren't too many vessels with this coating technology installed anywhere." Judt and Roust supervised a crew of up to 37 workers involved in the repair, surface preparation, and painting of the *Alaska Ocean*.

Before painting, the ship needed a major repair. During stormy weather, the trawler must confront waves as high as 50 feet. "There was a big dent in the steel in the forward end of the boat under the bow thrusters, probably caused by the impact of big waves hitting the boat," says Roust. "We took out a 12-foot by 12-foot piece of steel and replaced it with new steel." Only then were they ready for surface prep.

Ring Around the Blaster

On the underwater hull, a copper slag blast media with a water ring was used to remove corrosion, grime, and marine growth that had attached itself to the bottom of the ship.



After being spot-blasted and sweep-blasted with a water ring attached just behind the blast nozzle, the trawler's freeboard gets a high-gloss, UV-resistant top coating of Proline 4800 in Alaska Ocean Seafood Blue.

"Water rings are mounted just behind the blast nozzle," explains Roulst, "so water is projected around the blast stream, allowing a significant reduction in dust emissions."

Surface preparation activities at the freeboard line and above, including the topside structures, involved several different blasting techniques. All areas up high were power tool-prepared using sanders and needle guns to prevent excessive dust emissions. Air pollution control is a major consideration during these types of jobs, Judt notes.

On the freeboard, active corrosion was spot-blasted to SSPC SP-6 and sweep-blasted to SSPC SP-7, also with a water ring.

The topside superstructure areas were degreased and cleaned with Proline 747 cleaner, an industrial degreaser and surface-etcher, and then lightly blasted with fresh water at 3,000-4,000 psi. "Etching helps to degloss the existing paint to promote better adhesion of the new system," Roulst says. An area of particularly severe corrosion appeared under the aft platform and over the net ramp where the trawl net is hauled aboard. This area was enclosed and sandblasted to SSPC SP-6.

After removing the vent louvers and six trawl doors, the crew sent them through Todd Pacific's blast and paint facility, replacing some of the louvers that were rusted away to nothing.

All Hands on Deck

The deck areas being prepared for polyurea application were blasted to SSPC SP-10. On the decks, the crews utilized a Sponge-Jet system because it creates very little dust emission and is more accessible in areas that contain machinery and other equipment.

"About half of the decks were blasted using Sponge-Jet's Silver Sponge Media 16 to SSPC SP-10 while the remaining half were prepared by using speed sanders, needle guns, and various scabblers on active corrosion spots followed by spot-priming and full topcoats," says Judt. Sponge blasting utilizes a special blast grit impregnated into sponge pieces about 1/4-inch in size.

"The Sponge-Jet blast pots we are using are small, hand-load types, while the metering valve is a small auger that feeds the sponge-impregnated media into the high-pressure air stream within the blast

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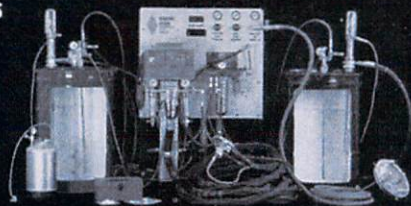
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A coating of EnviroLastic AL 450 SS polyurea is applied to about 7,100 square feet of the steel decks and railings of the *Alaska Ocean* to protect high-impact areas from the elements, including waves that can reach more than 50 feet.

hose," Judt says. "This system may seem slow, but there is very little equipment protection necessary compared to conventional sandblasting."

Containment was very easy and was accomplished with simple tarping. "Dust produced by the process is near zero," Judt says. "The spent media doesn't travel very far from point of impact, so it can be easily cleaned up. The sponge media is re-useable, and we are successfully using it several times over."

A Fast Cure Fits the Bill

In a very short time, Judt's crew applied EnviroLastic AL 450 SS polyurea to approximately 7,100 square feet of the railings and steel decks of the *Alaska Ocean*. The polyurea was applied to decks where fishing and offloading activities occur and which frequently take a beating from not only crane hooks, steel blocks, shackles, and huge, heavy nets, but also trawl doors weighing several tons each that mar the deck's surface. The crew used a Gusmer SPI 18/18 proportioning unit, D-type spray gun, and 16-kilowatt generator to power the heating units (pump and line) to maintain the 160° F application temperature.

"This polyurea dries to touch in 30 seconds, stays a little soft for about two minutes, and can be safely walked on in about five minutes," says Judt, who notes that the crews achieved 60 to 80 mils dft, which was better than the anticipated 60 mils dft.

The polyurea application took place while other repair and equipment installation crews were working side-by-side on their respective tasks. With a substantial number of craftsmen concentrated into a small area, it made coordination of the deck painting a challenge.

"Time is almost never available," Judt says. "Polyurea cuts the cycle time significantly and ties in with 'Lean Manufacturing' methods that are currently sweeping the nation." Lean manufacturing, he explains, is an operational strategy aimed at achieving the shortest possible cycle time by eliminating waste and reducing incidental work. The application of fast-drying polyurea to the decks and railings helped speed the job to completion, so that the *Alaska Ocean* was able to return to service within two months.

Because conventional non-skid deck coating systems generally take three to four days to apply, using polyurea also decreased the chances of damaging a freshly coated surface with footprints, raindrops, or debris from adjacent repairs, Judt added.

As with any coating system, surface cleanliness is essential for proper coating adhesion. "On one occasion, we painted a deck in a heavy downpour by building a tent to keep the deck dry," recalls Judt. "The fast curing nature of polyurea was what we needed to succeed, as conventionally cured coatings would have been damaged."

Single-Sourcing Makes It Easy

Based on the maintenance requirements specified by the *Alaska Ocean's* port engineer, the project incorporated several other coatings. "One of our priorities was to have all of our coatings supplied from one source," says Kaldestad, "so that we didn't have a problem trying to color-match all the different coatings used. Sherwin-Williams was able to meet all of our needs. In fact, we were even able to use one type of primer for the whole boat, which really made things easier."

Sherwin-Williams' Seaguard 5000 HS epoxy primer was used on all

parts of the ship. The product provides an anchor for the new polyurethane topcoat because of its excellent adhesive properties. "It also becomes part of the preservation barrier, keeping moisture and chlorides away from the steel and aluminum surfaces," Judt explains.

Now back at sea, the *Alaska Ocean* proudly sports her new coat, and her owners can rest assured that their investment is being protected from corrosive salt water and other causes of deterioration. "The men and women of Todd Pacific Shipyard worked hard to give this owner a high-quality product," says Judt. By combining traditional skills and innovative materials, they can take pride in the knowledge that this fishing trawler will be shipshape for years to come. CP

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