

U.S. Based Marine Company Uses CHEMCLAD SC to Salvage & Protect Pier Fender

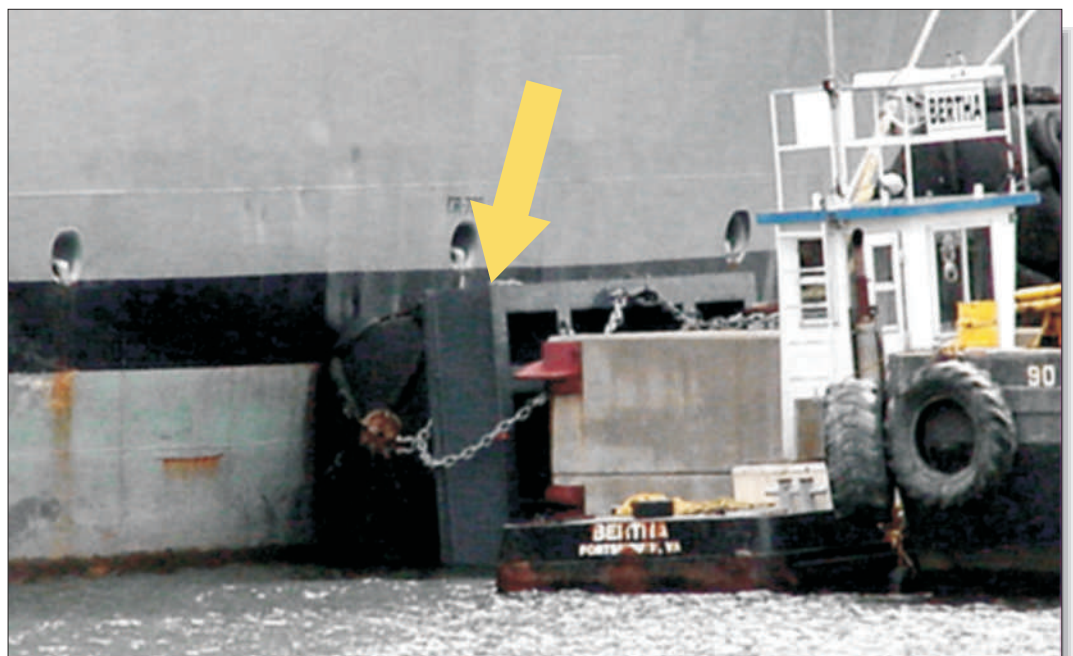
This 10 ton pier fender, used as a buffer between concrete pier pilings and boat hulls, was over 10 years old and suffering from severe erosion and corrosion due to constant exposure to salt water and tidal changes.

The local ENECON distributor was contacted to help the company's engineers find a fast, yet cost effective and long term solution to this erosion/corrosion problem.

The ENECON Engineering Specialist recommended that all the fender's deteriorated steel be cut out and replaced. Then all surfaces were thoroughly grit blasted and cleaned.

The first coat of **CHEMCLAD SC** gray was applied by airless spray followed by a second coat of **CHEMCLAD SC** light gray. A total of 40 units were used for this application.

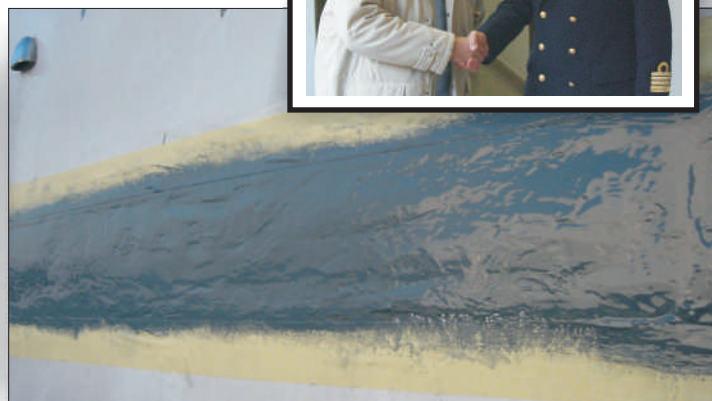
Not only was the job done on-time, and to the delight of the port engineers, but it was also done under budget.



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Italian Coast Guard Selects CHEMCLAD XC To Solve Corrosion Issues



This Italian Coast Guard vessel had been experiencing some severe corrosion on its hull.

ENECON Italia was contacted to help find a quick and cost effective solution.

The affected area was first grit blasted to remove all corrosion and prior coatings. The entire area was then rebuilt with 6 mm of CeramAlloy CP+AC and reinforcement mesh.

This repaired area was then protected with CHEMCLAD XC.

The ship's command was so pleased with the results that many other vessels in this class, as well as other classes, have been repaired and protected with ENECON products.



Spanish Navy Protects Cargo Deck with CHEMCLAD SC Non-Skid Safety System.



The hangar floor on this Spanish Naval vessel, used to transport tanks and other heavy vehicles, had been suffering from corrosion as a result of the failure of a conventional paint system.

Due to the scope of the project (1,000 square meters / almost 11,000 square feet), the ship's engineers contacted the local ENECON Field

Engineering Specialist to help find a cost effective and reliable solution.

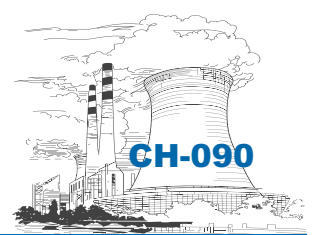
The ENECON Specialist recommended that a complete *CHEMCLAD SC System*, incorporating aluminum oxide aggregate to provide slip-resistant safety surfacing, be applied to protect this floor from further corrosion damage.

The first coat of *CHEMCLAD SC* was rolled out. To provide slip-resistance, aluminum oxide aggregate was broadcast and back-rolled into the *CHEMCLAD SC* as it was applied.

A final topcoat of *CHEMCLAD SC* was then applied - giving the Navy a slip resistant,

easy to clean surface that would resist damage from gasoline, oil and hydraulic fluid while protecting the deck from corrosion for many years to come.





After 13 Years, CHEMCLAD Holds Up On MSC Hospital Ship's Laundry Decks



This Military Sealift Command (MSC) hospital ship has an ENECON repair that has performed beautifully for over 13 years...and counting.

Engineering Specialist, it was recommended that the floors be grit blasted followed by 2 coats of CHEMCLAD SC.

The ship's laundry room decks were corroded from industrial washing machine spillage. Originally the ship's Port Engineer wanted to install a stainless steel liner atop the carbon steel deck. After consulting the local ENECON Field

With over 1,000 beds on this ship, the floors of this laundry room can be a corrosive place. CHEMCLAD SC has eliminated this threat for over a decade.



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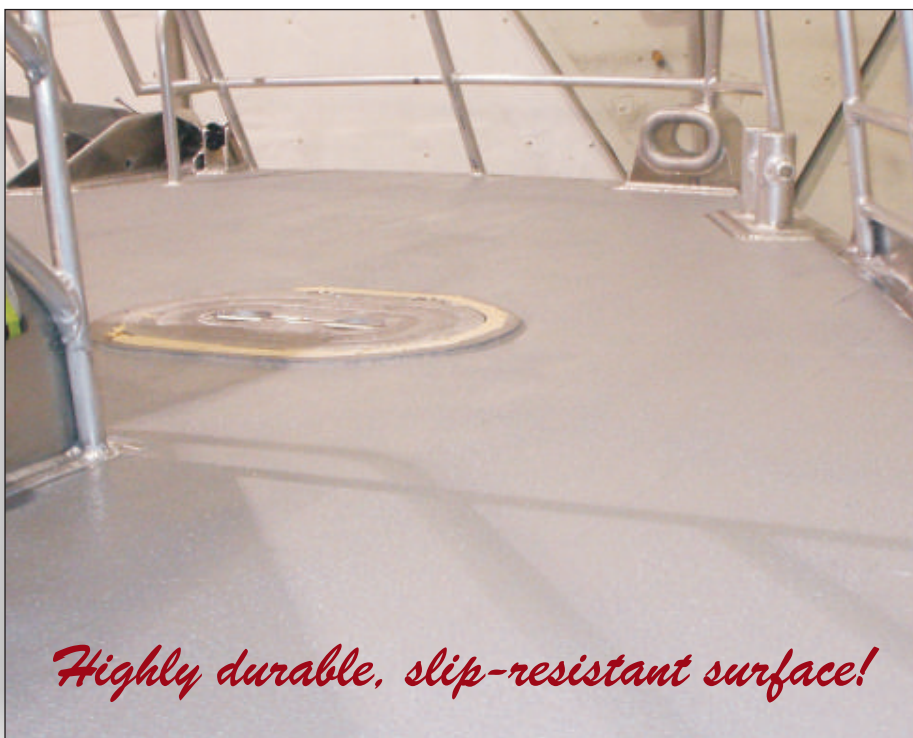
Research Vessel Selects ENECLAD FPS For Its Deck Surfacing Needs



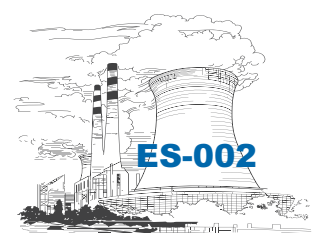
This aluminum hull catamaran is designed to be used as a research platform in one of the National Marine Sanctuaries. The marine engineers wanted a high performance, non-slip deck coating that would provide many years of service. They selected ENECLAD FPS because of its durability and ease of application (no odors or V.O.C's) and ease of cleaning.

The installation procedure included the following steps:

Due to blasting constraints imposed by the client in their building, it was decided to grind the aluminum with a 24 grit disc on a 4-1/2" side grinder to roughen the surface. The deck was then wiped down with a commercial solvent. The FPS was applied using a 1/4" nap, shed-resistant mohair roller. The initial coat of FPS was applied at 12 mils followed by a broadcast of aggregate to provide a non-slip surface texture. The aggregate was then encapsulated with a final back-roll of FPS. \$10,000 worth of ENECLAD FPS was used on this project.



Highly durable, slip-resistant surface!



PANAMA CANAL Picks ENESEAL to Protect Engine Room Insulation



**ENESEAL can prevent damage to insulation caused by...
oil
water
impact**

The Panama Canal Commission operates a number of specialty launches for ferrying pilots and personnel throughout the Canal.

damage is the fact that the insulation is also subject to oil impregnation, creating a potential fire hazard.

The insulation on the exhaust systems of the twin diesel engines is subject to splashing by both salt and fresh water. In addition, mechanical damage during maintenance checks is a virtually unavoidable problem.

In an effort to protect the insulation from these damaging and dangerous conditions, the Panama Canal engineers selected ENECON ENESEAL HR to completely seal and encapsulate the insulation.

Of greater concern than both the water and the mechanical

**ENESEAL HR...
..oil resistant,
...water resistant,
...impact resistant!**



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ENESEAL CR Protects Venting Pipes on German Container Ships

Oil tank ventilation pipes located on German container vessels, part of a major German shipping line, were suffering from heavy corrosion causing pitting and massive holes in the pipes. Damage of this nature to these pipes would cause oil leaks as well as vapor leaks which could be a health risk to those on board.

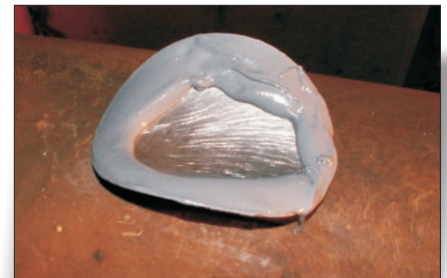
To find a fast, reliable and cost effective solution, ENECON Germany was contacted and it was recommended that a combination of **METALCLAD DurAlloy** followed by **ENESEAL CR** be used to repair then protect these venting pipes.

After minimal preparation of the pipes, the large holes were repaired with stainless steel patches shaped to the contour of the pipes and adhered using DurAlloy. A first coat of ENESEAL CR was then applied. The pipes were wrapped with a fiberglass reinforcement tape and then overcoated with a second layer of ENESEAL CR creating a highly durable, corrosion resistant, elastomeric 'skin' providing extraordinary environmental protection.

The repair and protection of these venting pipes in just 2 ships was valued at over \$60,000 USD. The vessel owners were so impressed with the results that other ships in the fleet with similar problems will be repaired then protected with ENECON products.



Holes caused by corrosion



Stainless steel patch with DurAlloy



Patch applied to hole



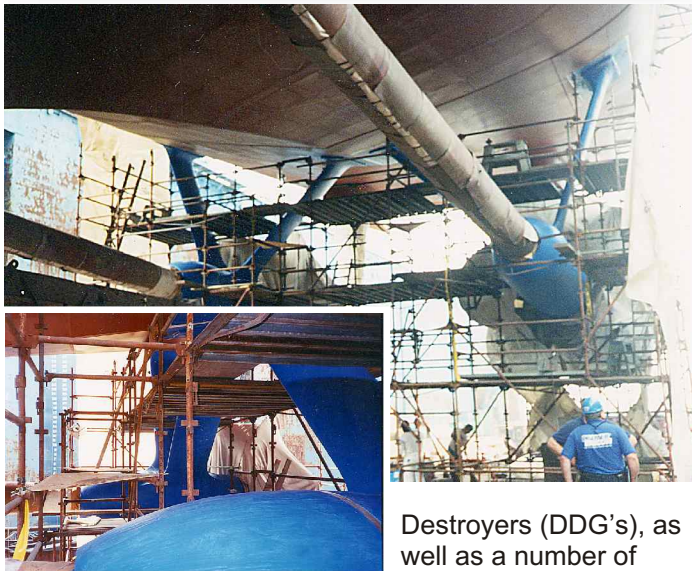
Fiberglass reinforcement tape over 1st coat of ENESEAL CR



Final coat of ENESEAL CR

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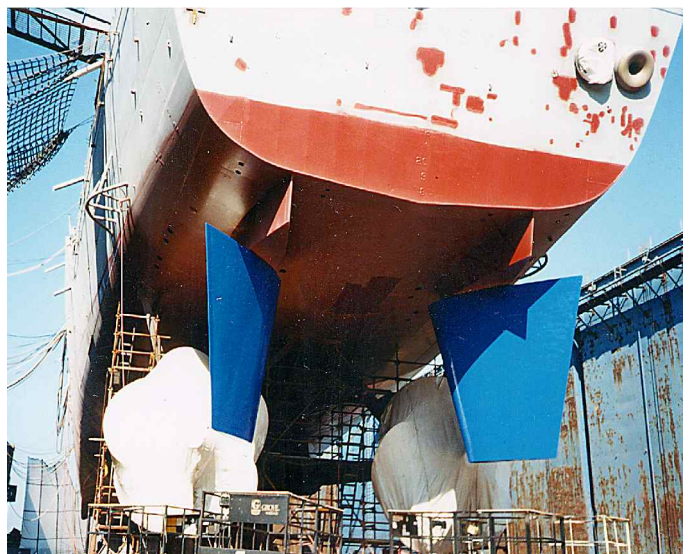
FLEXICLAD DuraTough Providing Unsurpassed Cavitation Protection to U.S. Navy Ships Since 1995.



After an extensive, two-year evaluation program, the U.S. Navy selected ENECON's DuraTough elasto-ceramic, polymer composite as the high performance material of choice to protect components on its newest Aegis Destroyers from severe cavitation damage. Rudders -- and in some cases struts and barrels -- on the latest Arleigh Burke Class

Destroyers (DDG's), as well as a number of guided missile frigates (FFG's), cruisers (CG's) and certain fast-attack craft, have been protected with the DuraTough system.

Commencing in June of 1995, these DuraTough applications have been successfully completed at various Naval and private shipyards located in Maine, Virginia, Mississippi, California and Hawaii.



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Major International Shipbuilder Selects DuraTough To Protect Rudders On Their New Vessels



One of the largest international shipbuilding and engineering companies based in Korea was looking for the best repair and protection solution for their cavitation issues. Over the years they had tested numerous products and techniques but all of these provided only limited protection and were deemed unsuccessful.

The design engineers approached their local ENECON Korea Engineering Team for a cost effective and

commercially proven solution. ENECON Korea suggested a standard DuraTough DL application in the high cavitation zones followed by CeramAlloy CL+AC over the leading edges of the DuraTough to protect them.

Numerous sea trials confirmed that our DuraTough & CeramAlloy combination was extraordinarily effective and the shipbuilder has now standardized on this system for all their new LNG and Container ships.



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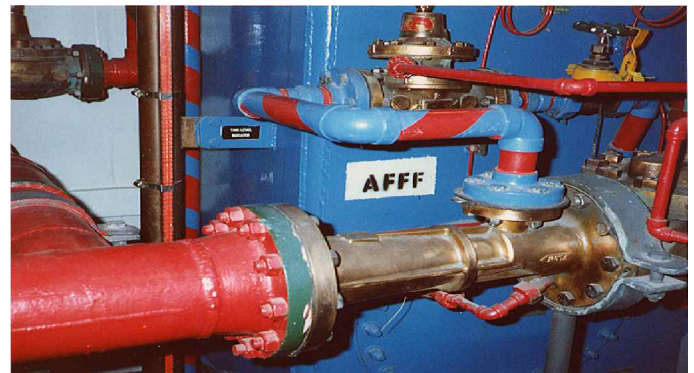
**US Navy
turns to
CeramAlloy
to solve
tough
chemical
attack
problems
caused by
fire fighting
foam (AFFF)
on decks &
bilge
pockets
where
conventional
paints
simply don't
measure up.**



FROM: DCC STEWART, USS AUSTIN (LPD-4)
TO: PALMER ENECON
SUBJ: CERAMALLOY APPLICATION TO AFFF BILGES

MAINTAINING AFFF STATION DECKS HAS LONG BEEN A PROBLEM FOR SHIPS FORCE. VARIOUS PRIMERS AND PAINTS HAVE BEEN APPLIED TO NO AVAIL DUE TO THE CORROSIVE PROPERTIES OF AFFF, DURING A RECENT VISIT FROM PALMER ENECON TECH REPS A CERAMALLOY REPAIR WAS DONE TO THE NUMBER 2 MAIN CONDENSER, THERE WAS A CONSIDERABLE AMOUNT OF CEREMALLOY LEFT OVER FROM THIS REPAIR, THE SUGGESTION WAS MADE TO USE CERAMALLOY IN MY AFFF BILGE POCKETS, THE BILGES WERE TAKEN DOWN TO BARE METAL, SUPER CLEAN WAS USED TO THOROUGHLY CLEAN FOR FINAL PREP, THE CERAMALLOY WAS MIXED AND APPLIED TO THE BILGE AT ROUGHLY 3/16" THICKNESS, WHEN IT WAS DRY AND HARD VARIOUS TESTS SUCH AS DOUSING WITH SALT WATER AND AFFF WERE CONDUCTED, THIS WAS ALLOWED TO SIT IN THE BILGE OVERNIGHT, IT WAS THE RINSED DOWN WITH FRESH WATER, THE CERAMALLOY WORKED PERFECTLY, IT IS BY FAR THE BEST SUBSTANCE USED YET TO MAINTAIN AFFF BILGE POCKETS, IT IS VIRTUALLY MAINTENANCE FREE AND REQUIRES ONLY AN OCCASIONAL WET MOP TO CLEAN, THIS STUFF WORKS!!

V/R DCC (SW) STEWART



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ENECON Introduces CeramAlloy CL+ [AC] in a Special “AFFF Red” Color for the US Navy



First coat of CeramAlloy Grey color followed by a second coat of CeramAlloy AFFF Red



CeramAlloy has been specified by the US Navy for many years for preservation of AFFF Station decks. Over the years it has had a flawless performance record. The Navy, however, wanted a special red color to match some of its other deck coatings.

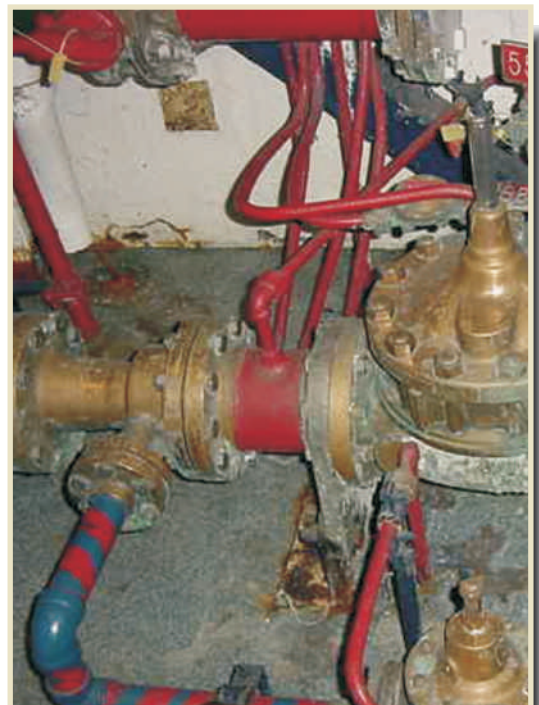
ENECON was pleased to oblige and now offers its CeramAlloy CL+[AC] in an AFFF RED color which conforms to the Navy's requirements. Numerous AFFF Station deck preservation projects have been carried out with this special AFFF Red color since its introduction in 2002, on a variety of different classes of ships – including aircraft carriers.



CeramAlloy Continues to Protect AFFF Stations on this Aircraft Carrier for Over 5 Years



**Still excellent results
after 5 years!**



AFFF Station 5 Years ago.

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Croatian Navy Uses CeramAlloy to Repair and Protect Propeller Shafts



The propeller shafts on this Croatian Naval ship were suffering from severe erosion / corrosion in the areas around the struts and before the propellers. This was due to many years of operation in a harsh salt water environment.

ENECON Croatia was contacted and it was recommended that a combination of CeramAlloy CP+AC and CL+AC be used to repair the existing erosion / corrosion damage and to protect against future damage.

CeramAlloy CL+AC were then applied.

The ship's engineers were pleased with the cost and speed of this application and other applications on similar ships have already been approved.



Previously applied epoxy coatings had failed and the ship's engineer was looking for a long lasting, cost effective solution.

After first grit blasting the damaged areas, a layer of CeramAlloy CP+AC was applied to rebuild the damaged areas. Two final coats of



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Moroccan Fishing Boat Saves Propeller Shaft with METALCLAD



Client: Commercial fishing boat

Location: Agadir, Morocco

Problem: A 20-year-old fishing boat propeller shaft was suffering from severe erosion. Replacement shafts cost in excess of \$15,000.

Solution: DurAlloy was used to rebuild the shaft's thickness. It was then machined down to a smooth finish. Finally two coats of CeramAlloy CL+AC were applied to provide maximum erosion and corrosion protection. The customer was so pleased with the results, ENECON Morocco has had 6 more propeller shaft repair/protection projects.



Damaged propeller shaft



Shaft machined



DurAlloy applied

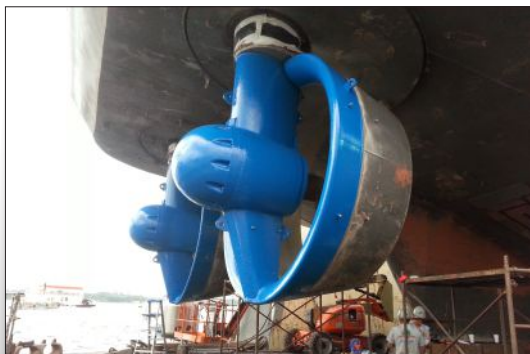
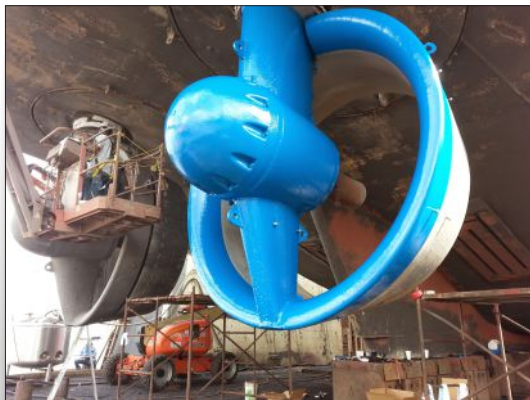


DurAlloy machined smooth



CeramAlloy CL+AC applied

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Tugboat Operator Selects CeramAlloy to Combat Erosion/Corrosion on Their Kort Nozzles



This tugboat belonging to a major international marine company in Florida was suffering from the effects of erosion & corrosion on its Kort nozzles. The local ENECON Fluid Flow Systems Specialist was called in to help find a solution.

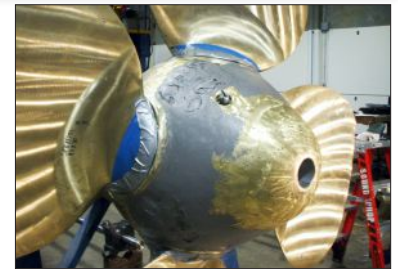
After preparing the surface by grit blasting to acquire a 'white metal' finish, two coats of CeramAlloy CL+AC were applied.

The owner of the vessel was so pleased with the final results that another tugboat's Kort nozzles have already been scheduled for repair.



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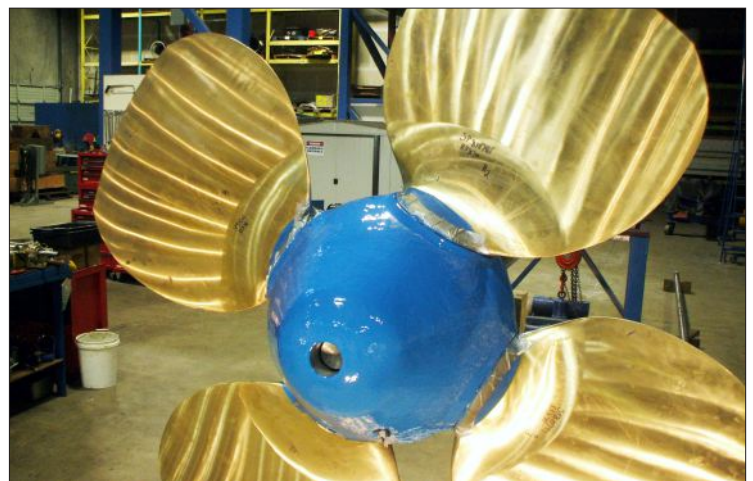
CeramAlloy Used to Repair Fishing Boat & Tug Boat Propeller Hubs



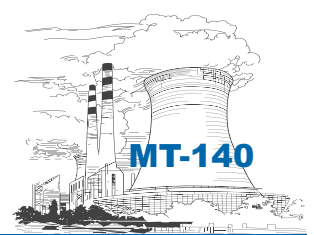
Controllable Pitch Propellers (called CPP 'wheels') are used by tug boats, fishing boats and many other commercial vessels. The pitch (angle) of the propeller blades can be adjusted for power, speed and even direction – all without changing engine speed. The hub of these propellers, as well as the base of the blades, often suffer severe erosion/corrosion damage. Problem solved.

CeramAlloy CP+AC and CL+AC have been used for years to repair these critical areas - eliminating the need for welding. ENECON's Project Engineer in the Seattle, WA, region has repaired dozens of these propellers with outstanding results using the application technique illustrated on this bronze propeller.

Problem solved.



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Preventative Maintenance with CeramAlloy Protects Intake Spools on U.S. Navy Cargo Ship



The U.S. Navy routinely uses ENECON solutions to repair and protect their onboard equipment.

In order to extend the service life of new intake spools and transition lines being installed on a cargo ship, the Navy chose to proactively protect them with CeramAlloy CL+AC.

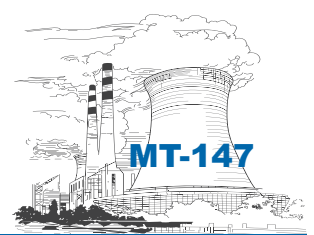
After grit-blasting to a 4 mil profile, 2 coats of CeramAlloy CL+AC

were applied to some 15 spool pieces and transition lines that carry sea water to the engine for cooling.

CeramAlloy has been used by the U.S. Navy for applications like this for more than 20 years due to its ability to provide outstanding protection to equipment subject to salt water erosion and corrosion.



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CeramAlloy Solves Erosion & Corrosion Problems on Panama Canal Tugboat Pump

At the Panama Canal, a fleet of tugboats assists ships passing through the newly expanded locks. Each of the tugboats have pumps like this one, which pump salt water.

Constant exposure to salt water caused the entire surface of this pump to suffer from erosion and corrosion. This caused a weakening of the metal which then reduced the pump's efficiency in addition to leaks at the seams.

ENECON Panama was asked to provide a solution

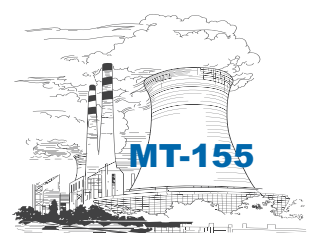
to the problems on these critical pumps.

After grit blasting the pump and all of its components, a first coat of CeramAlloy CL+AC was applied to wet out all surfaces. CeramAlloy CP+AC was then used to rebuild the weakened and damaged areas. Then a final layer of CeramAlloy CL+AC was used to protect the pump from future erosion and corrosion problems.

The success of this application has led to many more projects with the Panama Canal Authority.



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U.S. Navy Selects CeramAlloy HTP & HTL (High Temperature Composites) to Repair Uptake Hatches on Vertical Missile Launch Systems



The U.S. Navy was in need of a solution to stop corrosion on their VLS (vertical launch system) uptake hatches on destroyer and cruiser class ships

were causing premature coating failure of the hatches.

Then two coats of CeramAlloy HTL were applied to resurface and protect the entire area.



Missiles are launched through open uptake hatches, usually located on the deck of a ship. The extreme high temperatures (400°F+), oxidized spent rocket fuel and environmental conditions of salt water

ENECON's high temperature resistant repair and rebuilding composite, CeramAlloy HTP, was used to repair and rebuild the severely eroded areas of each hatch. The HTP was then machined to maintain the required tolerances.

The Navy was so pleased with the first twelve pairs of uptake hatches, more will be protected in the near future.



Repairs made with CeramAlloy HTP



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