

NANO-CLEAR INDUSTRIAL COATING FOR OXIDIZED MARINE ASSETS



OSG Ship Management, Inc. Tampa, FL

Industrial Customer:
OSG Ship Management

Project:
Protect oxidized fiberglass and painted assets including lifeboats, fire station boxes and the ship's painted surfaces that had become degraded by UV and salt water. The customer's goal of the protection project was to reduce maintenance cycles by at least one to two years. **NCI** will provide 2-4 years of protection.

Project Location:
New Orleans, LA

Applicator:
Industrial Solutions USA and OSG personnel

Coating Formulation:
Nano-Clear Industrial (**NCI**) coating

Application System:
Paint pad, woven fiber for use with solvented coating formulations

Date:
Application: 17 April 2016

Conditions:
Temperature - 71F
Relative Humidity - 61%,
Wind – 20 mph steady with
28 mph gusts



PROJECT OVERVIEW:

OSG Ship Management wanted to conduct a field application of **NCI** on various assets on the Overseas New York to confirm **NCI** as a viable long term protective coating solution with the goals of protecting valuable assets and saving money through the elimination of maintenance cycles.

The primary application was to coat the top half (the orange section) of a fiberglass lifeboat. The additional applications were to two painted surface areas – one on the stern side of the blue funnel (smoke stack); the other was to the stern side of the white housing superstructure. All of these applications are regularly exposed to direct UV and salt spray that degrade fiberglass gel coat and aromatic epoxy paint film. Note: the fiberglass fire station boxes had been coated with **NCI** prior to this demonstration.

Coating Formulation:

NCI - a crystal clear, aliphatic, moisture cured, one component polyurethane/polyurea hybrid formulation with extreme cross-link density for UV, chemical and abrasion resistance.

NCI is formulated to penetrate and fortify *existing* paint systems (newly painted or highly oxidized), not replace them.

Applications:

Fiberglass assets - rescue boats, lifeboats, fire station boxes, enclosures, covers, etc.
Painted surfaces – housing superstructure, funnel, rails, hull, some deck areas, communication towers, pipe, containment pans, structural components, signs, life preserver/ring buoy, etc.

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CURRENT SITUATION:

Nano-Clear Industrial (**NCI**) coating was applied to the top half (the orange section) of an oxidized lifeboat while the Overseas New York was in port for an IRP in New Orleans, LA. The gel coat on the lifeboat had become oxidized and worn from continuous exposure to UV and salt water. Allowing the degradation to continue would have compromised the integrity of the lifeboat which was not an option as people's lives depend on that boat in emergency situations.

Maintenance is a significant portion of any activities' budget in terms of materials and labor. Industrial Solutions USA proposed **NCI** as an effective product to extend the protection of the ship's assets and eliminate the cost of frequent ongoing maintenance cycles over several years.

In addition to fiberglass assets, the Overseas New York has large areas of painted surfaces that oxidize on a continuous basis which requires constant re-painting. In general most of the paint used on board is an aromatic epoxy type of paint that is susceptible to UV degradation and the destructive forces of wet/dry salt water exposure. Aromatic epoxy paint formulations are very good "work horse" paint products but are not capable of long term protection in a severe marine service environment. **NCI** is formulated to work with, not replace existing paint systems – working together creates a "composite" paint system that yields very long term protection and maintains an excellent aesthetic appearance for long periods of time.



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ISUSA SOLUTION:

NCI is formulated to penetrate and fortify existing oxidized, weathered gel coat and paint systems.

NCI is new cross linking formulation technology. This cross linking creates a “tough” coating that combines with existing gel coat and paint systems forming a long lasting protection solution.

NCI chemically bonds to the gel coat and paint with adhesion promoters and also bonds mechanically by penetrating into the porosity of the underlying coating.



***Aromatic
paint
systems
need help to
achieve the
years of
protection
required by
asset
owners/
managers.***

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Before NCI



After NCI



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APPLICATION:

Preparation:

- The surface was washed with Super Clean, the biodegradable detergent shown (at the concentration recommended by the manufacturer) and water using a soft/medium bristle brush prior to sanding the surface.
- Then the surface was rinsed with water and a soft/medium bristle brush similar to the one shown. Alternatively, using a pressure washer and a sponge to remove debris and contaminants is acceptable.
 - Using a brush or sponge in tandem with water is highly recommended to ensure the substrate surface is clean.
- The orange portion of the lifeboat was sanded using 800 grit wet/dry sand paper and a pneumatic orbital sander.
 - This is a good grit size to remove contaminants and oxidized material from the gel coat without breaching the gel coat layer into the fiberglass.
- The lifeboat was washed with the detergent above using a soft bristled brush and rinsed with water and a soft/medium bristle brush to remove all debris from the sanding operation.
- The asset was allowed to air dry overnight. It is important to use forced air (clean compressed air or a leaf blower) to remove water that pools in recesses and behind attachments/protrusions. During this demonstration it rained on and off for two days and the sun did not shine before we could begin the application so the use of forced air is very useful.
- Because of the continuous high winds and proximity to the water the lifeboat was wiped down with acetone after air drying and prior to application of the **NCI** to displace water/moisture, remove salts and other contaminants that blew onto the lifeboat.
- The paint patches on the smoke stack and on the housing superstructure were washed with the biodegradable detergent and brush then rinsed with clean water then allowed to dry.
- Once the existing paint areas & lifeboat gel coat were dry and the boat/paint patches were masked, it was time to begin the application.



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Application:

To obtain the best, consistent finish, the **NCI** should be applied using an airless sprayer or HVLP gun.

- In general, coat a section of the existing gel coat/paint with **NCI**, ensuring all areas of the painted surface are thoroughly coated.
- Then coat an adjacent section.
- Go back to the previous coated section and apply another coat of **NCI** spraying in a cross-hatch direction.
- Once an acceptable finish is obtained stop applying the **NCI** and allow it to “level”. Because of the low viscosity of **NCI** (40cps) the finish will “level” out.
- Apply the **NCI** from the top of the asset working down to the bottom.
- It is important to watch the previous section you have applied the **NCI** to because on oxidized paint surfaces the **NCI** will absorb into the oxidized paint at different rates. When areas absorb more of the **NCI** than other areas simply go back and apply another light coat of **NCI** to even the finish.

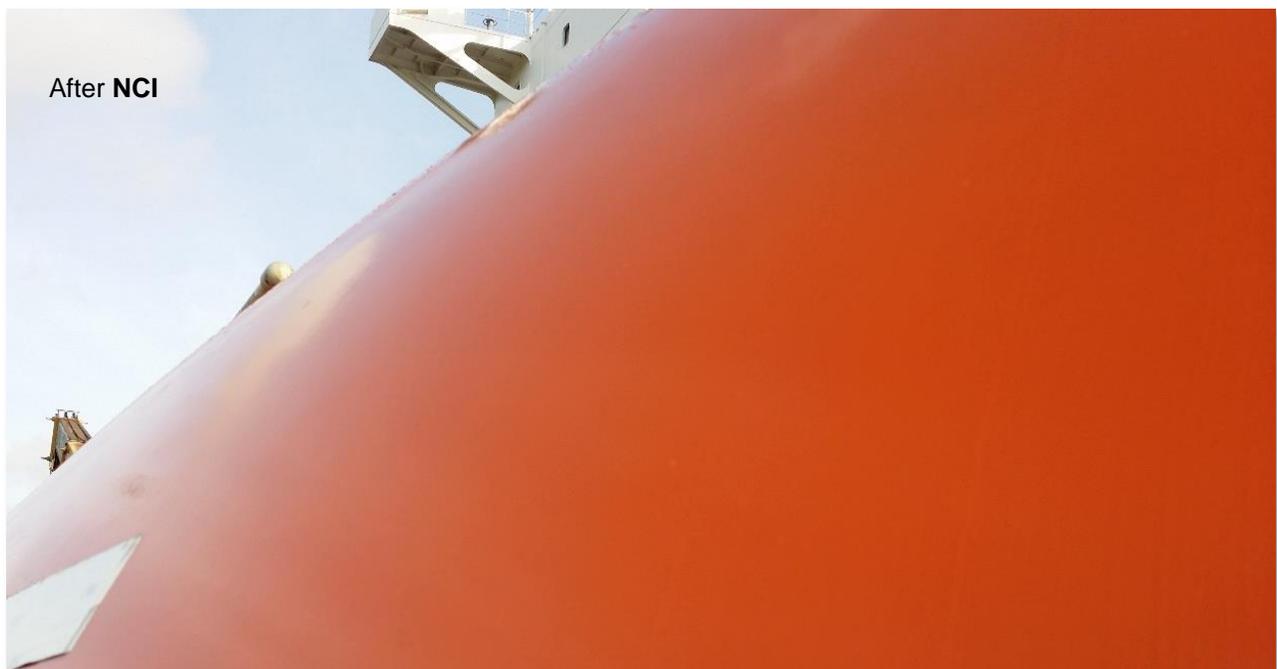
However if conditions do not allow for the use of spray equipment, the **NCI** may be applied using a woven paint pad (shown) or paint roller (woven or mohair, mirror finish grade). When using either of these products make sure they are constructed to withstand solvent attack otherwise they will come apart while using them with **NCI**.



In this situation a woven paint pad was used because the wind was constantly blowing a 20 mph with gusts up to 28 mph making spraying impossible.

NCI is a moisture cured (humidity cured) formulation so when the temperature is warm, it is humid and the wind is blowing these conditions “force cure” the product once it is applied to the substrate.

The application conditions were overcast, windy, 71F and 61% RH so the **NCI** was applied in small areas of approximately 2' x 3' starting from the top of the lifeboat. The application started by doing small sections on the top of the boat between the rails that are attached on the upper portion of the sides. The **NCI** was applied to a section working the product into the surface then quickly finishing that section with smooth, consistent pad stokes that left the section with an acceptable smooth finish that had pad “brush” marks.



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Application (continued):

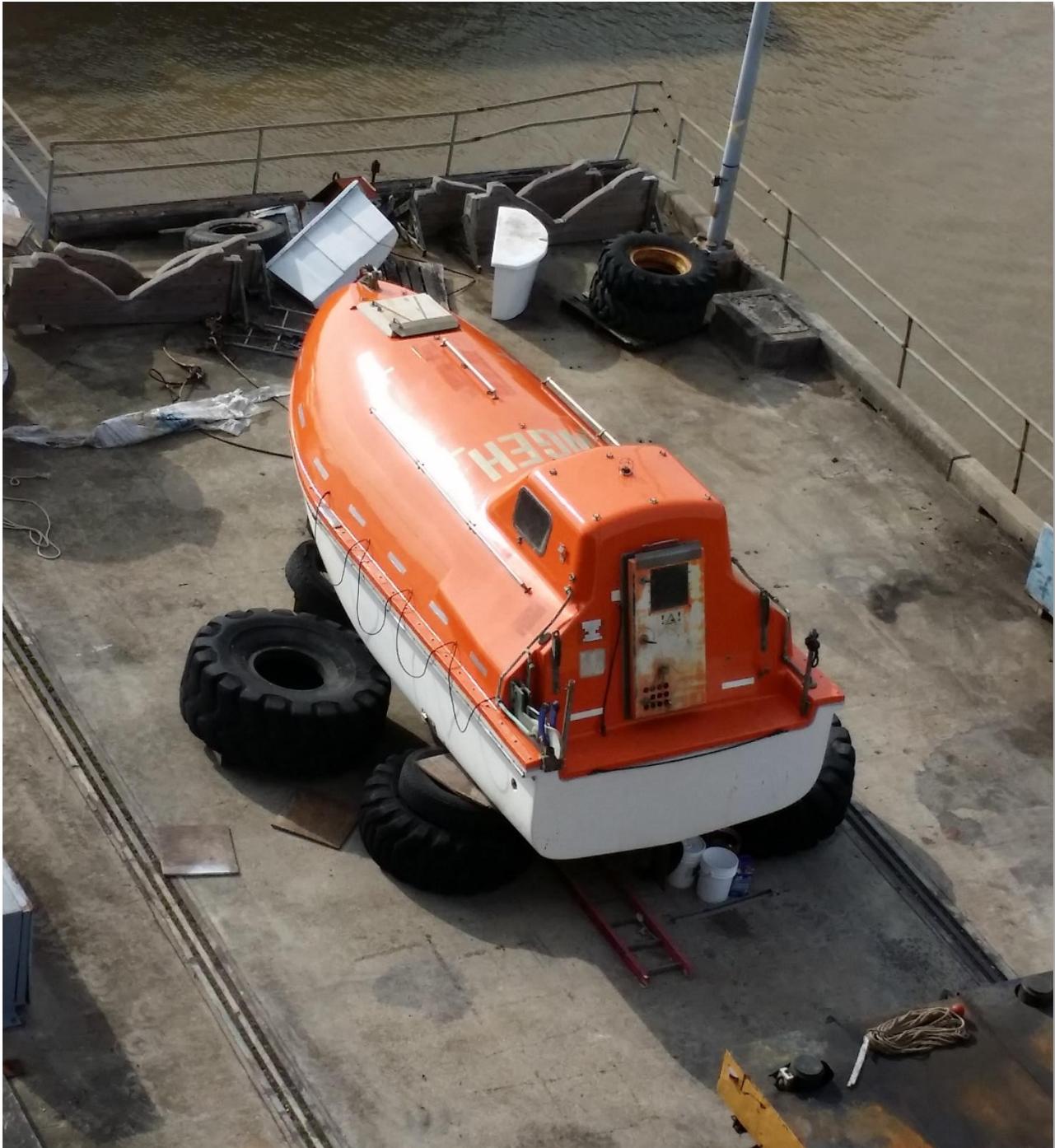


The weather did not allow for the NCI to level as it normally would however plenty of material was applied to the surface of the lifeboat to achieve the target dry coating thickness of 1+ mils that will provide for long term protection.

The application continued on the sides of the lifeboat, again covering small sections approximately 2' wide from the rail to the bottom lip of the orange section of the lifeboat. The lip was coated last.



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NOTE: The door was not addressed in this demonstration because the paint degradation had progressed too far.

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NCI applied to lifeboats from the Overseas Chinook and the Overseas New York



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NCI applied to oxidized paint test patches.



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SUMMARY & CONCLUSION:

- 1) **NCI** was applied to a fiberglass lifeboat and oxidized painted surfaces to protect them from degradation and to eliminate maintenance cycles.
 - a. **NCI** penetrated the gel coat and painted surfaces fortifying them – the resulting protective coating *system* exhibits much better physical properties than the original gel coat or paint alone extending the protective service life for many more years saving several maintenance cycle costs (money and labor resources).
 - b. **NCI** does not replace gel coat or paint systems, it is formulated to work with them - **NCI** is the economical solution *to extend the performance life* of those systems.
- 2) **NCI** can be applied in less than optimal field conditions on shore or on board. This versatility is important because having optimal field conditions is rare.
 - a. In good field conditions (low or no wind, temperatures of 50F – 90F and relative humidity of 45% or more), **NCI** may be sprayed using conventional spray equipment.
 - b. The weather conditions in this application were sustained 20 mph winds with gusts of 28 mph, low 70F temps and moderate relative humidity (61%) which did not allow us to spray apply the **NCI**.
 - c. A woven paint pad was used to apply the **NCI**. This method allowed plenty of material to be deposited on the fiberglass to create a tough monolithic 1+ mil dry coating thickness over the entire orange top half of the life boat.
- 3) **NCI** is easy to work with by personnel with wide ranging skill levels.
 - a. **NCI** is a one component coating.
 - b. **NCI** requires no mixing or thinning.
- 4) Timing of **NCI** application.
 - a. **NCI** can be used on new surfaces/newly painted surfaces.
 - b. **NCI** is formulated to also work on oxidized surfaces that are 2 – 6 years old (depending on the service environment. The key is to use **NCI** before substrate degradation commences.

NCI Saves Money:

- Prevents pre-mature gel coat and paint failures
- Eliminates substrate preparation required for new paint
- Eliminates labor for same
- Saves primer and paint material costs
- Saves labor for same



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CALL TO ACTION:

Inspect the lifeboat and paint patches in 6 and 12 months.

Industrial Solutions USA is asking OSG Ship Management to implement the application of **NCI** on oxidized company fiberglass and painted assets.

Incorporating **NCI** into the OSG Ship Management maintenance protocol will extend the service life of all assets and save significant money over the current paint system(s) alone.

Industrial Solutions USA
develops and sells “tough”
ELASTOMERIC COATINGS & LININGS
to help industrial customers protect their assets from
corrosion, UV, chemicals and abrasion