MCI

FROM GREY TO GREEN NEWSLETTER

New Case Histories

Washington St. & Senate Avenue Parking Facilities Preservation

The Washington Street and Senate Avenue parking garage in Indianapolis, Indiana was in need of repair consisting of miscellaneous crack injection, repair/replacement of expansion joints, pavers, concrete deck toppings, and sealing the concrete deck with a corrosion inhibitor water repellent with a fugitive dye. This repair was the second phase consisting of 380,500 square feet, (35,300 square meters). Following repairs, the concrete deck surfaces were blastracked and MCI[®]-2019 W FD was applied at 150 square feet per gallon (3.68 meter squared per liter) with a low pressure garden nozzle spray. MCI[®]-2019 W FD was applied on the weekends and the garage was opened for vehicular traffic on Monday morning.

The initial phase consisted of over 500,000 square feet (46, 465 square meters) and was completed in 2007. Due to the success of the first phase and durability thus far, MCI[®]-2019 W FD was chosen as the water repellent/corrosion inhibitor for the second phase of the project. The installation was successful and the garage was opened on schedule.



Restoration of Steam Vats, Seattle, WA

Steam vats used for processing logs into lumber had severely deteriorated to the point that the customer was considering demolition.

After removing the corroded concrete, the surfaces were treated with MCI[®]-2020 and the rebar was coated with MCI[®]-2023. Spalled areas were then patched with MCI[®]-2702. Lastly, the contractor epoxy injected structural cracks and coated the interior for chemical resistance and to brighten the spaces.

The contractor believed the MCI[®] to be the best choice to truly mitigate corrosion on these heavily damaged structures.





New Case Histories

West Seattle Seawall Restoration, Seattle, WA

The concrete seawall was damaged by corrosion on the rebar. There was limited time to repair the damage between incoming tides.

After applying MCI[®]-2020 to the existing concrete, new concrete was poured to repair the area; then, when the concrete set, MCI[®]-2021 was applied to provide corrosion protection to the new concrete. Cortec[®] MCI[®] products effectively addressed the customers corrosion issues with minimal impact.



Trillo Nuclear Center Restoration, Spain

The Trillo Nuclear Power Plant in Spain was constructed in 1979 and put into service in 1988. By 2008, environmental impacts, such as low cover and high humidity and temperature, had caused extensive corrosion damage to the thin concrete walls and embedded reinforcing steel of the pressurized water reactor. The plant operators sought and environmentally friendly, economical solution to the problem.

Once the damaged areas were cleaned and prepared, rust was removed, reinforcing steel was passivated using repair grout containing MCI®-2006 NS, repair mortar with MCI®-2006NS was applied to patched areas, and MCI®-2020 and an anti-carbonation coating were applied to all surfaces. MCI®-2020 migrated a considerable distance through the concrete and provided protection to embedded reinforcing metals reducing the corrosion rate and extending the useful service life of the structure. MCI®-2006NS in the grout and repair mortars migrated to adjacent areas to protect embedded metal. All applications were easy to apply, highly effective, safe to handle, non-toxic, and provided an economical restoration to Trillo Nuclear Central.





Severn Bridge Suspension Cable Protection, Wales

The suspension cables on this type of bridge are known to corrode over a long period of time. The 20 inch (508 mm) diameter main cable is constructed from 8322 high tensile galvanized wires of 0.196 inches (4.98 mm) in diameter, with a total area of 314 square inches (202,580 square millimeters) of which approximately 20% is comprised of voids. The cable is wrapped in 0.144 inch (3.66mm) mild steel galvanized wire. Dehumidification is used to reduce the moisture level around the cables but does not provide perfect protection. Cortec[®] inhibitors were chosen by the engineers to augment the dehumidification during the drying phase and act as a back-up during shut down periods or maintenance when the dry air supply is not available.

Original thoughts were to fog a VpCI[®] powder or water-based inhibitor into the system but neither option was acceptable to the owner. A test rig was built using VpCI[®]-105 Emitters as the corrosion inhibitor source to ensure no detrimental effect on the materials/components of the cable system. The testing proved positive but the larger challenge was to ensure that enough of the emitters entered the airflow wand would be distributed as needed. Cortec's PTC Emitters were developed as a result.

A simple hatch and crate system that is part of the main dehumidification pipework was developed. This system allowed the inhibitor to be placed in the airflow without disrupting the system when the product needed to be changed out. The dosage rate of 5 PTC Emitters per 10 injection sleeve inputs per month was initially determined to be the effective quantity and frequency of change.

The system has been running since 2007 and provided the PTC Emitters are changed every 3 months the corrosion rate measured by probes has remained constant. Testing is now being carried out with a newly developed VpCI[®] sensor solution to confirm the presence of VpCI[®] inhibitor in and around the cables. By using the PTC Emitters with the dehumidification system, the number of strand breakages per year is now down to zero.



Hakalau Seismic Retrofit, Big Island Hawaii

Corrosion on the steel girders resulted from volcanic sulfur dioxide and chloride enriched moisture due to close proximity to the Pacific Ocean and Kilauea Volcano.

Cortec[®] VpCl[®] CorrVerter[®] provided an excellent solution for priming the rusty steel surface where further corrosion protection was required and proper surface preparation was difficult to achieve. MCl[®]-2005 NS and MCl[®] Mini Grenades were an excellent solution. Due to their ease of use and ability to adhere and protect embedded steel surfaces, greatly increasing expected service life.



Punalu'u Stream Bridge, Oahu, Hawai

Punalu'u Stream Bridge is located steps away from the Pacific Ocean, enduring constant trade winds as high as 40 mph in the winter coming off of the ocean. The atmosphere is highly contaminated with chlorides and sulfur dioxide from the nearby Kilauea Volcano located on Hawaii's big island and inland water reports show rainfall is at pH 4.5. The acid rain combines with chlorides to create a very corrosive environment.

MCI®-309 was injected along with air just after the post-tensioned cables were placed and MCI®-2005NS admixture was added into the new concrete placed on the bridge. MCI®-309 is readily absorbed by the grout and does not need to be removed when the post-tensioned chambers are injected with grout. Cortec's MCI®-309 and MCI®-2005 NS provide excellent protection in an aggressive environment. MCI® was used because it provides protection to the steel surface, greatly extending the service life of the structure.



Las Olas Isles Residential Restoration, Ft Lauderdale, FL

A multi-million dollar waterfront residence circa 1940 was experiencing severe concrete deterioration from: high chlorides (sea salt) and excessive humidity which makes the chlorides "sticky" – holding them on the surface of the concrete and provides electrolytes to keep the corrosion cell working with little surface rain.

Because of the extent of the spalling, some columns and beams were deemed too deteriorated and were replaced. Crews then followed the ICRI Guidelines for making structural repairs using VpCI®-422 to clean the rebar, VpCI®-415 to neutralize, MCI®-2246 bonding agent and a modified repair mortar. MCI®-2020 V/O was then applied to all concrete grade beams, tie beams and columns. The owner anticipates prolonged service life and reduced maintenance costs which will help if they ever decide to sell the property.



	Ð	Date	Торіс	Presenter	Details
		11/26/2012	MCI [®] Year End Update	Jessi Meyer	Sales updates, new CH updates, Looking to the Future!
	n	12/3/2012	Randolph Avenue Bridge - Testing Update	Josh Hicks	Josh will go over Cortec's oldest admixture case history and provideupdated test results and information from the paper presented at NACE.
	q	12/17/2012	MCI® Specialty Products - Introduction	Jessi Meyer/ Jack Sykes	Composition, properties, case histories, etc MCI®-309, MCI Mini Grenades®, PTC Emitters
	(D)	1/14/2013	MCI® Specialty Products - Testing for Dummies	Josh Hicks	ASTM, electrochemistry testing, etc MCI®-309, MCI Mini Grenades®, PTC Emitters
		2/6/2013	NOT A WEBINAR - World Of Concrete MTG 1st Quarter Updates, Specs	Jessi Meyer/ Jack Sykes	Sales updates, new CH updates, Admix specs. Looking to the Future!
	C	3/11/2013	MCI® Specialty Products - Introduction	Jack Sykes	Composition, properties, case histories, etc VpCI® Rust Removers, VpCI® CorrVerter®, MCI® CorShield®
	Š	4/8/2013	MCI® Specialty Products - Testing for Dummies	Josh Hicks/ Eric Uutala	ASTM, electrochemistry testing, etc VpCI® Rust Removers, VpCI® CorrVerter®, MCI® CorShield®
2	<u> </u>	5/13/2013	2nd Quarter MCI [®] Updates	Jessi Meyer/ Jack Sykes	Sales updates, new CH updates, Looking to the Future!
	g	6/10/2013	MCI® Specialty Products - Introduction	Jack Sykes	Composition, properties, case histories, etc MCI®-2020 Gel, MCI® Wall Defense, MCI®-2027 (or new product from Rick)
	D	7/8/2013	MCI® Specialty Products - Testing for Dummies	Josh Hicks	ASTM, electrochemistry testing, etc MCI®-2020 Gel, MCI® Wall Defense, MCI®-2027 (or new product from Rick).
)i	8/12/2013	3rd Quarter MCI [®] Updates	Jessi Meyer/ Jack Sykes	Sales updates, new CH updates, Looking to the Future!
		9/9/2013	MCI® Specialty Products - Introduction	Jack Sykes	Composition, properties, case histories, etc MCI® Creteskin, MCI®- 2061, MCI® CorteCure™
		9/23/2013	$MCI^{\scriptscriptstyle \otimes}$ Specialty Products - Testing for Dummies	Josh Hicks	ASTM, electrochemistry testing, etc MCI [®] Creteskin [®] , MCI [®] -2061, MCI [®] CorteCure [®]
		10/14/2013	TBD	TBD	TBD
	<	10/28/2013	TBD	TBD	TBD
		11/11/2013	MCI [®] Year End Update	Jessi Meyer	Sales updates, new CH updates, Looking to the Future!



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