



MIGRATING CORROSION INHIBITORS
FROM GREY TO GREEN

January 2019



Cortec® Middle East Receives Dubai Central Laboratory Certification for MCI® Products in Accordance with ASTM C 1582/C1582M-11

Dubai-based Cortec® Middle East LLC has received certification from the Dubai Central Laboratory Department (DCLD) to manufacture and supply MCI® admixtures known as Migrating Corrosion Inhibitors for concrete. Under the terms of the certification of product conformity of the DCLD of Dubai Municipality, Cortec's MCI®-2005 and MCI®-2005 NS will now be included in a DCL website list of DCLD certified products under certificate number CL18020610 (visit <https://www.dm.gov.ae/en/Business/DubaiCentralLaboratory/Pages/default.aspx> for more information). The certification was given after independent auditing confirmed that the products met the requirements of ASTM C1582 Standard Specification for Admixtures to Inhibit Chloride-Induced Corrosion of Reinforcing Steel in Concrete.

Cortec's MCI®-2005 and MCI®-2005 NS are amine carboxylate, biobased corrosion inhibiting admixtures for new construction or repair. MCI®-2005 is a USDA Certified Biobased Product that contains 67% USDA certified biobased content. MCI®-2005 NS is also biobased at 27%. Adding these MCI® admixtures to concrete mixes is a simple, time-proven, and cost-effective method of achieving significant enhancement in durability. Their low dosage rate combined with lower toxicity and environmental impact make them attractive alternatives to traditional calcium nitrite corrosion inhibiting admixtures.



Research on Concrete Durability Using MCI® at Nanjing Yangtze River Bridge

Nanjing Yangtze River Bridge is the first modern bridge over the mighty Yangtze River that was completely Chinese designed and constructed. The bridge carries approximately 80,000 vehicles and 190 trains daily. Located in the historical city of China, Nanjing, it is a double-decked railroad truss bridge and serves as an essential part of one of the most important routes in China, connecting the capital city, Beijing, with the coastal cultural and financial center, Shanghai. The bridge is 20 meters (66 ft) wide. Its upper road deck spans 4,588 meters (15,052 ft), and its lower deck, with a double-track railway, is 6,772 meters (22,218 ft) long. Since its debut in 1968, the bridge has made a tremendous contribution to the development of the entire area and has witnessed the unprecedented changes of Chinese people's lives.

After 50 years in service, the bridge is now showing signs of deterioration, such as cracks in supporting beams, corrosion of rebar, and spalling of concrete cover. Extensive evaluation concluded that carbonation was the main cause for the concrete deterioration. A full-scale bridge restoration project started in 2016. Part of the restoration is to perform a study on the means to improving concrete durability through long-term monitoring and evaluation of the concrete structure with applied concrete repair products. Three flagship products from Cortec® Corporation (Minnesota, USA) were selected for this study: MCI®-2005 (admixture), MCI®-2020 (surface treatment), and MCI®-2018 (surface treatment).

MCI® stands for Migrating Corrosion Inhibitor™. The vapor of MCI® molecules migrates through concrete pores and lands on rebar surfaces to provide corrosion inhibition, a feature that is unique to Cortec's MCI® products. MCI®-2005 is a USDA Certified Biobased Product concrete admixture; MCI®-2020 is a surface-applied organic Migrating Corrosion Inhibitor™; and MCI®-2018 is a surface treatment product with dual functions as corrosion inhibitor and concrete sealant. These three MCI® products are low toxicity and are UL certified to meet ANSI/NSF Standard 61 for structures containing potable water. The first phase of the study was to collect baseline data and apply MCI® products. Before the mitigation measures, the base corrosion rates at the "control areas" (plain concrete) and "treatment areas" (areas to receive MCI® treatment) were recorded.

The MCI® mitigation measures were then applied. MCI®-2020 and MCI®-2018 were applied on the vertical sections of the support beams, and MCI®-2005 was incorporated into the new concrete cover over the arch.

Following the first phase, researchers and engineers will periodically measure the corrosion rates at the structures with MCI® products applied and those without MCI® treatment. In due time in the coming years, corrosion characteristics in these testing areas will be monitored and evaluated. Stay tuned!



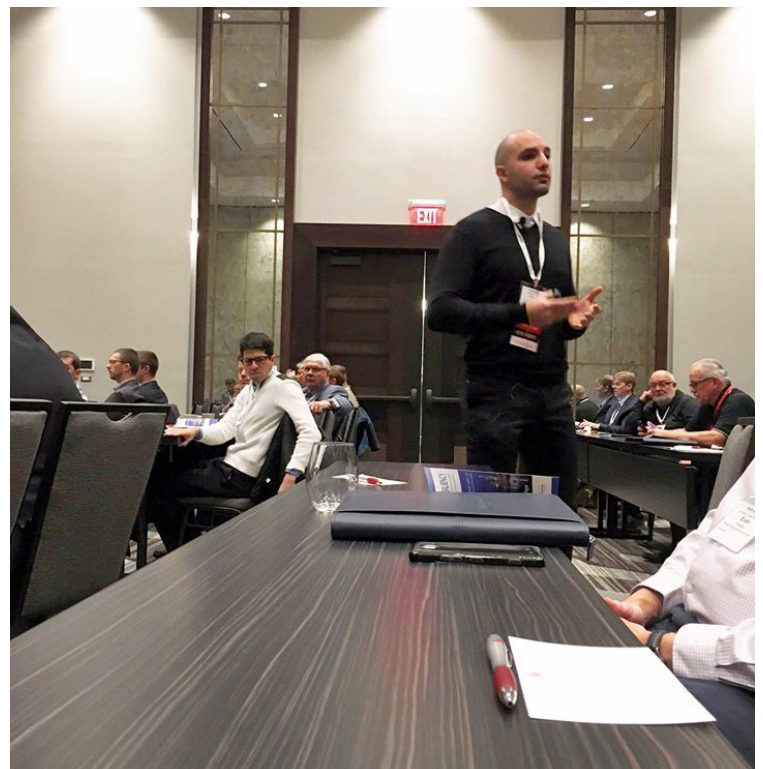
Corrosion Cops Feature MCI® to Structural Engineers Association of Hawaii

Cortec® distributor Corrosion Cops shared Cortec® MCI® solutions at the SEAHO (Structural Engineers Association of Hawaii) Convention, August 14th-15th at the Aulani resort in Hawaii. Linda Moran, a distributor for many years, highlighted the benefits of MCI® as an organic mixed inhibitor technology with anodic and cathodic protection against corrosion. Following the presentation, she received additional feedback from an MCI® customer that mentioned how his company likes to use MCI® admixtures over other brands because of its fixed dosage rate and its non-set-accelerating admixtures (the latter of which is especially important for users in the Hawaiian climate).



Cortec® Plays Important Role at Fall ICRI Convention

Ashraf Hasania (MCI® Technical Sales & Market Manager, Canada) represented Cortec® MCI® at this year's Fall ICRI Convention, held November 7th-9th in Omaha, Nebraska, with the theme of "Resiliency: Above and Beyond Concrete Restoration." Hasania gave his first ICRI presentation on "Repair of Concrete Utility Poles with the Use of Migrating Corrosion Inhibitors" to a full audience and attended two committee meetings. Cortec® sponsored the conference WiFi. Vice President of Sales – Asia/MCI®, Jessi Meyer, is the current chair of the Marketing Committee, which unveiled the new ICRI logo at the convention.



MCI® in Brazil: “An Idea Whose Time Has Come”

Corr Solutions’ team of four—including Matheus Rocha da Silva, Adalberto Thiel, Fernando Chacorowski, and Luiz Flores—introduced MCI® Technology to a welcoming audience at the 60th Brazilian Concrete Congress, held September 17th-21st in Foz do Iguaçu, Brazil. Many professors, high level engineers, and consultants were eager to learn about the concrete corrosion inhibitor technology, which is relatively new in Brazil. Corr Solutions Engineer Matheus Rocha da Silva was also able to take part in the standards creation meetings. In reflecting on the simultaneous occurrence of the Third International Dam World Conference at the same location, he also remarked how important MCI® could be in terms of raising structural life cycles, reducing maintenance costs, and thus making power cheaper to benefit the general population.

Vice President of Sales – MCI®/Asia, Jessi Meyer, traveled with Eng. Rocha da Silva from Corr Solutions the week of December 3rd. Corr Solutions covers Cortec® MCI® sales in the Brazilian market, and this visit was to support Corr Solutions’ sales efforts in the region. Highlights of the week included presentations by Meyer to two engineering institutes – one in Paraná and one in São Paulo, which drew more than 100 attendees at each, both in person and through the live online video stream the organizations provided. In addition to these keynote presentations, Meyer and Eng. Rocha da Silva visited several consultants, contractors, and jobsites in the region and provided MCI® sales training to the Corr Solutions team.

One of the visits was to ITAIPU Binacional, the second largest hydroelectric power plant in the world for generating capacity. Despite having a lower energy generating capacity, ITAIPU generates nearly equal amounts of energy on an annual basis as the largest power plant in China. After Meyer, Eng. Rocha da Silva, and Fernando Chacorowski took a tour of the dam and surrounding areas, they gave an MCI® presentation to ITAIPU employees, and concluded the visit by being treated to a private tour of ITAIPU’s impressive concrete test laboratories.

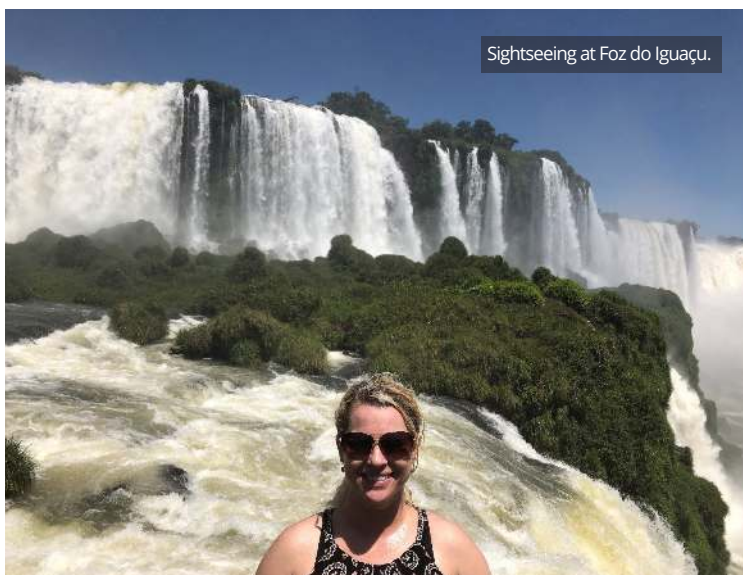
Corr Solutions found a way to sneak some sightseeing into the packed agenda – treating Meyer to a few hours of hiking in Foz do Iguaçu to see a spectacular view of their 280 waterfalls and wildlife. The extremely successful week concluded with a jobsite visit that provided extraordinary views of Sugarloaf Mountain in Rio de Janeiro.

“Nothing not even the forces of darkness can stop an idea whose time has come”!*

The excitement for the increasing momentum of MCI® in the Brazil market was captured well when Francisco Hidalgo of Codemet (Ecuador) tweeted a meme several months ago remarking “Nothing not even the forces of darkness can stop an idea whose time has come”!*

*Apologies to Victor Hugo.





In the Press

This summer, the Construction Specifier magazine published an article entitled, "Parking garages: Enhancing durability with migrating corrosion inhibitors." The piece discusses the advantages of countering concrete corrosion by adding migrating corrosion inhibitors to

- New parking garages via concrete admixtures
- Existing parking garages using MCI® liquid surface treatments
- Repair projects by including MCI® repair mortars or surface treatments

The informative article can be read in full at:

<https://www.constructionspecifier.com/parking-garages-enhancing-durability-with-migrating-corrosion-inhibitors/>

Case Histories

Protection of PT Strands for Tagliamento River Viaduct

MCI®-309 was chosen for protection of post-tensioning (PT) cables prior to grouting on the new Tagliamento River Viaduct, a 1.5 km (0.9 mile) dual carriageway being constructed in Italy using the technique of conjugated segments in pre-stressed reinforced concrete with post-tensioning. MCI®-309 is easily fogged through post-tension ducts using a low-pressure air hose after PT strands are placed in the duct. The MCI®-309 powder vaporizes and adsorbs on metal surfaces, forming a protective molecular layer on the tendons. As a mixed inhibitor, MCI®-309 will discourage both cathodic and anodic corrosion reactions from taking place on the PT tendons. Little or no surface preparation will be required before application, and the MCI®-309 will not need to be flushed out before grouting, reducing labor and further exposure to corrosive elements.

To read the full case history, please visit the following link:

https://www.corteccasehistories.com/?s2member_file_download=access-s2member-level1/ch613.pdf



Protection of Roskilde Fjord Bridge PT Cables

Post-tension (PT) bridge sections for the new dual-carriage-way highway bridge over the Roskilde Fjord were cast in Poland and installed at the Denmark bridge site. MCI®-309 was needed to protect the PT cables from corrosion during the casting and transport phases before grouting. MCI®-309 was used during the casting in Poland to assure corrosion protection of the PT cables as the design requested. Grouting was done after precast segments had been at the Denmark bridge location site for 30 days. The results of using MCI®-309 were satisfactory, and the customer was pleased with the ease of use.

To read the full case history, please visit the following link:
https://www.corteccasehistories.com/?s2member_file_download=access-s2member-level1/ch615.pdf



Photos Courtesy of: Rizzani de Eccher

Protection of Roskilde Fjord Bridge PT Cables

After ten years of inactivity, the old Intelhorce factory was restored for use as a logistics distribution center for the children's clothing company Mayoral. Carbonation was found to be the cause of corrosion. The concrete was inspected, the deteriorated concrete was removed, and the reinforcement was sandblasted. MCI®-2021 was subsequently surface-applied over the entire surface of the walls using a low-pressure spray. A UV tracer was used to ensure total coverage. Exposed rebar was also covered with passivating grout, and repair mortar was applied where concrete cover was missing. The repair allowed Intelhorce to be preserved as one of the most valuable and unique vestiges of the Málaga industry of the 20th century.

To read the full case history, please visit the following link:
https://www.corteccasehistories.com/?s2member_file_download=access-s2member-level1/ch620.pdf





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Upcoming Events

Join Us Next Month at World of Concrete!

Cortec® MCI® is eager to catch up with distributors and reps at the upcoming World of Concrete convention, January 22nd-25th in Las Vegas, Nevada! The show is expected to draw tens of thousands of construction industry professionals from around the globe for a time of networking and staying abreast of concrete industry developments.

Cortec® will be presenting MCI® Technology solutions at Booth #S12050 and will also be holding a meeting and special event for distributors and reps!

Tradeshows

World of Concrete

January 22-25, 2019
Las Vegas Convention Center
Las Vegas, NV
USA
Booth # S12050
<https://www.worldofconcrete.com>

NACE Corrosion Conference & Expo 2019

March 24-28, 2019
Music City Center
Nashville, TN
USA
Booth # 1500
<http://nacecorrosion.org/>

ICRI 2019 Spring Convention

April 8-10, 2019
Omni Hotel & Resorts Jacksonville
Jacksonville, FL
USA
<https://www.icri.org/>

ICRI 2019 Fall Convention

November 11-13, 2019
Doubletree Hilton Philadelphia Center City
Philadelphia, PA
USA
<https://www.icri.org>



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Cortec® MCI® is on Facebook and LinkedIn! Join the conversation and follow us online to stay updated.

<https://www.facebook.com/cortecmci/>
<https://www.linkedin.com/showcase/mci-migrating-corrosion-inhibitors/>

