



December 2017

Standards

MCI® Products Qualify for CE Certification

Several Migrating Corrosion Inhibitor™ products have received CE certification, allowing them to be freely sold and used in the European Union. The marking verifies that Cortec® meets the 2+ certification system requirements for assessing and verifying the constancy of MCI® CorrVerter®, MCI®-2018, MCI®-2019, MCI®-2021, and MCI® Architectural Coating under the EN 1504 standards for "Reinforcement Corrosion Protection" and "Surface Protection Systems for Concrete."

To qualify for CE certification, these MCI® products underwent extensive testing at an independent lab in Spain to evaluate the products' properties and understand their reactions under a wide variety of circumstances. Representatives of the independent lab also traveled to Cortec® headquarters in the USA to verify onsite compliance with CE production methods and documentation systems. In addition, Cortec® has added state-of-the-art equipment to further improve our European QA testing specs and ability to deliver consistent and reliable products to our customers.

Unique MCI® Applications Featured in Shotcrete Magazine

This summer, Cortec® teamed up with a shotcrete application specialist and past president of the American Shotcrete Association to write a compelling article on the use of MCI® in shotcrete. The article, entitled, "Aiming for Extended Service Life with Migrating Corrosion Inhibitors," was published in the Summer 2017 issue of Shotcrete Magazine and goes into a detailed description of the workings and advantages of Cortec® MCI® Technology. It also discusses the use of MCI® in a variety of shotcrete situations. Shotcrete is concrete that can be sprayed onto a surface rather than being poured into a special form, making it especially useful for concrete repair work or uniquely shaped structures. The article describes the use of MCI® in shotcrete for PENN DOT tunnel and bridge repairs, the repair of an amusement park volcano, and the restoration of an old factory being made into an apartment complex.

The full article can be found at:

https://www.cortecvci.com/whats_new/announcements/Shotcrete-NA.pdf



ACI and ICRI Fall Convention Business and Fun

The Cortec® MCI® team continues to play an active role in both ACI (American Concrete Institute) and ICRI (International Concrete Repair Institute), attending each organization's 2017 Fall Conventions for further learning, networking, and contribution to the concrete industry.

At the October 15th-19th ACI Fall Convention in Anaheim, California, VP of MCI® Sales, Jessi Meyer, attended meetings for four committees: 201 (Durability), 212 (Chemical Admixtures), 222 (Corrosion of Metals in Concrete), and 365 (Service Life Prediction). By participating in committee meetings, Meyer stays informed about industry changes and is also able to contribute from her own knowledge acquired during more than 17 years in the industry.

Meyer also contributed extensively to meetings at the 2017 ICRI Fall Convention, November 15th-17th, in New Orleans, Louisiana, where she participated in the executive forum; chaired the marketing committee; and served on the sustainability/service life committee, corrosion committee, and nominations committee.

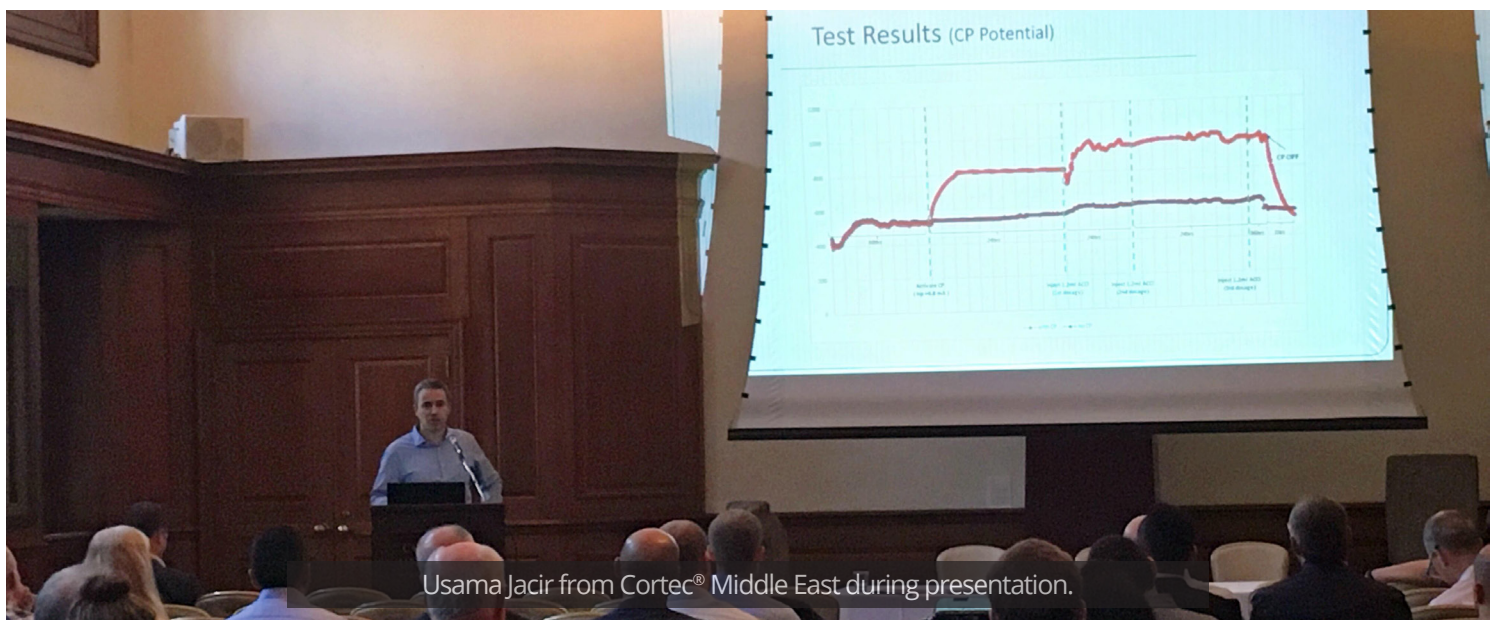
A highlight of the convention was an inspiring keynote lunchtime address given by Lt. General Russel Honoré, well-known for his leadership in New Orleans during the Hurricane Katrina disaster. He drew attention to data from the American Society of Civil Engineers' website to point out the cost of corrosion and the importance of addressing it in order to have infrastructure that will withstand natural disasters like hurricanes or tornadoes.

Cortec® made a major contribution to the event by sponsoring the Wi-Fi for all attendees. Cortec® also had fun handing out Mardi-Gras beads at the MCI® booth in recognition of the New Orleans atmosphere. A final highlight of the week was attending the "Night Out at the Bayou Barn" where the team even had the chance to pet an alligator!



MCI® Use with CP Presentation at NACE Concrete Service Life Extension Conference

Usama Jacir from Cortec® Middle East gave a presentation on "Evaluation of Interactions Between Cathodic Protection and Corrosion Inhibitors for Reinforced Concrete" at the NACE Concrete Service Life Extension Conference held June 27th-29th at Columbia University in New York. He discussed the testing of Migrating Corrosion Inhibitors used with cathodic protection systems. The results showed a synergistic effect with some migrating inhibitors, where the inhibitor enhanced cathodic polarization to reduce the cathodic protection current requirement.



VP of MCI® Sales Speaks at Brian Cherry International Concrete Symposium

Cortec® VP of MCI® Sales, Jessi Meyer, was invited to speak at a special two-day concrete corrosion conference hosted by the Australasian Corrosion Association (ACA) July 26th-27th in Melbourne. The convention honored Professor Brian Cherry of Monash University as the "Father" of corrosion science and engineering in Australia, and featured many high caliber international speakers on subjects related to Professor Cherry's life work.

Because of Professor Cherry's connection to MCI® research, Meyer was invited to present a 19-page paper on "Organic Corrosion Inhibitors – New Build & Existing Structures Performance." It was published along with the other technical papers in a book given to attendees and available for sale from ACA. Meyer was also able to take in many of the other speakers and commented, "It was very educational to see all the research done by other people and to learn more about how different parts of the world think about concrete repair, different repair methods, and corrosion in concrete in general."



EUROCORR 2017 Presentation by Dr. Behzad Bavarian

Longtime Cortec® colleague Dr. Behzad Bavarian of California State University, Northridge, gave a presentation September 3rd-7th at EURO-CORR 2017 on "Improving Durability of Reinforced Concrete Structures using Migrating Corrosion Inhibitors as Admixtures." The presentation, co-authored by Akinbosedede Oluwaseye and Lisa Reiner, discussed how amine carboxylate based migrating corrosion inhibitors can successfully extend the service life of reinforced concrete structures by inhibiting rebar corrosion, as demonstrated by ASTM G180 testing.

Cortec® MCI® Welcomes Aboard Building Product Professional in Southeast

Cortec® Corporation is pleased to welcome Alan Jolley, MBA, as its new MCI® Regional Sales Manager for the Southeast U.S. region. Alan brings with him more than 15 years of experience in business and product development, with a decade of focus on building products and repair mortars.

In addition to his familiarity with the concrete repair industry, Jolley has a diverse range of industry experience, having worked for major global companies including Gravotech, PolyOne, Shurtape, and Sto Corp. Alan was introduced to Cortec's corrosion solutions previously as a Cortec® manufacturing partner for repair mortars and looks forward to serving the Southeastern U.S. with Migrating Corrosion Inhibitor™ solutions for all concrete repair, maintenance, and new build projects.



ASTM Electrochemical Corrosion Testing Conference

Ming Shen, Ph.D., and Casey Heurung, both involved in MCI® R&D and technical support, headed to Atlanta, Georgia, November 13th-14th for the ASTM International symposium on electrochemical corrosion testing. The symposium was sponsored by ASTM Committee G01.11: Electrochemical Measurements in Corrosion Testing, one of the numerous branches of ASTM International that develop standard methods of testing to achieve consistency and credibility in test data in countless industries.

Shen and Heurung both found the symposium to be an important opportunity for networking with corrosion control industry professionals and learning about new tools and developments in ASTM corrosion evaluation standards that have emerged in the last ten years. Dozens of in-depth presentations provided insight into research and trends in the field.

One exciting development in particular was a presentation of new equipment that is said to be able to measure and pinpoint corrosion rates on rebar embedded in concrete without having to drill through concrete for direct contact with the rebar. The equipment uses electrical pulse response analysis to evaluate corrosion happening beneath the concrete surface. "We're interested in anything that we can utilize to make our lives easier to help us develop more products that are more impactful," Heurung commented in regard to the new invention.

Cortec® is also excited about new ASTM standard test methods that are on the radar for development and could be very useful for evaluating the effectiveness of corrosion inhibitors in concrete.





MIGRATING CORROSION INHIBITORS
FROM GREY TO GREEN

Case Histories

St. Croix River Crossing: Protecting Post-Tension Strands on Unique Extradosed Bridge

August 2nd, 2017, marked the opening of a specialized bridge connecting Oak Park Heights, Minnesota, with St. Joseph, Wisconsin. The construction site's sensitive location in the St. Croix National Scenic Riverway resulted in the design of a unique extradosed bridge (combination box girder and cable stay bridge) to minimize environmental and visual impact of the structure on the river way. Post-tensioning (PT) cables were used in the pier crossbeams and in approximately 1,000 pre-cast boxlike segments.

An unseen but important part of construction was protecting the PT tendons from corrosion before grouting. Grouting is commonly delayed several weeks or months on long-term projects or when extremely cold winter temperatures interrupt continuous grouting. State and federal requirements typically call for corrosion inhibitor application if the waiting period is two weeks or longer.

MCI®-309 was used extensively to protect PT tendons from corrosion during the multi-year construction project. MCI®-309 is easily fogged through post-tension ducts using a low-pressure air hose after PT strands are placed in the duct. The inhibitor vaporizes and adsorbs to form a protective molecular layer on the tendons. The layer helps reduce corrosion by inhibiting interaction with corrosive elements such as air, moisture, and chlorides. Little or no surface preparation was required before application, and the MCI®-309 did not need to be flushed out before grouting.



New Orbital Highway: Cost-Effective Protection of PT System

The new Orbital Highway Project and truck route in Qatar consisted of 200 km (124 mi.) of dual carriageway, including 22 major bridge and tunnel intersections. Two of these interchanges were Mesaieed Road / Wukair Bypass and Mesaieed Road / Mesaieed Road 1. To inhibit corrosion on post-tension cables before grouting, MCI®-309 was air-injected just after the placement of the post tension cables. This was a cost effective and easy to apply method of protecting the post-tension system from corrosion in the aggressive surrounding environment. MCI®-309 is readily absorbed by grout and does not need to be removed before grouting. This allowed the project to proceed without the expensive and time consuming process of flushing the ducts.



Stav Street: Repairing a Building Damaged by Corrosion

Stone cladding tiles began detaching and falling from a residential building in Hod Hasharon, Israel, only five years after construction. After seven years of litigation, it was ruled that restoration should include drilling and injection of MCI®-2020 Gel corrosion inhibitor. Wobbling and cracked cladding tiles were removed, and MCI®-2020 Gel was injected into holes drilled through the cladding. These holes were capped with cementitious mortar. Corroded anchors and stains were drilled out and filled with repair mortar, and all tiles were re-anchored with new screws. Six months after application, a test verified the presence of corrosion inhibitor throughout the concrete's volume. Five years after application, a visual survey showed no appearance of new corrosion stains. The project was deemed very successful, and additional projects of a similar nature have since been completed in Israel.



Sandburg Hall: Restoring Student Housing at the University of Wisconsin, Milwaukee

A cast-in-place concrete student residence hall at the University of Wisconsin, Milwaukee, was experiencing corrosion of embedded reinforcing steel. After the damaged areas were properly repaired, MCI®-2019 was applied to the exterior of the entire building to protect against moisture intrusion and also to protect against corrosion at the level of the rebar. The owners, engineers, and contractors were very impressed with the easy application of MCI®-2019, which was chosen because of its single component application of dual moisture repellency and corrosion protection.



Marina Arcade Building: Protecting Substructure in Corrosive Seaside Environment

The Marina Arcade building project at the Dubai Marina in U.A.E. was designed for mixed residential, retail, and recreational use. It consists of two basements, a ground floor, 47-stories, and a roof. It is located near the sea where the water table is high and the soil has high chloride content. Because of the challenges to durability posed by this corrosive atmosphere, the engineering consultants specified MCI®-2005 admixture for use in more than 10,000 cubic meters (13,079.51 yd³) of the entire concrete substructure. The admixture was preferred over other corrosion inhibitors because of its migration capability, low dosage rate, organic nature, and certification to meet NSF Standard 61 requirements for use in potable water structures.



Longboat Key Seawall: Extending Service Life for Future Generations

A private property owner building a new residence in Longboat Key, Florida, wanted to preserve his property for future generations. This included building a seawall to protect the shoreline from erosion. The owner required a 100 year design life for the seawall, a challenge compounded by the corrosive subtropical marine spray environment in which the seawall would be built.

The standard concrete mix design initially proposed was expected to require repairs in only 15.2 years, according to LIFE-365 independent service life prediction modeling. By adding MCI®-2005 into the mix design, Cortec® was able to significantly increase the predicted service life to 46.9 years, three times longer than the original mix. However, because of the owner's high expectations, the ready mix supplier proposed an alternative concrete mix used with the Florida DOT that alone brought the service life prediction up to more than 100 years. After adding MCI®-2005 into the LIFE-365 model, the service life prediction increased to more than 150 years, greatly exceeding the customer's initial expectations.

MCI®-2005 contains 67% USDA Certified Biobased Content and is UL certified to meet ANSI/NSF Standard 61 for use in structures containing potable water, making it a safer, more sustainable choice than traditional calcium nitrite admixtures that easily leach into water. MCI®-2005 will also help the structure qualify for LEED credits because of its manufacture in nearby Sarasota, within a 500 mile (805 km) radius of the residence.





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Vida Residence: Replacing Calcium Nitrite

Calcium nitrite was initially specified for corrosion protection in the substructure of a 57-story apartment tower in downtown Dubai, U.A.E. Ultimately, MCI®-2005 was approved and used as an alternative in more than 12,000 cubic meters (15,695 yd³) of concrete substructure elements. The decision was driven by the effectiveness of MCI®-2005 and resulted in the use of a safer, lower dosage corrosion inhibitor admixture that had already been used in the Burj Khalifa tower developed by the same client.



Upcoming Events

The World of Concrete is just around the corner, January 23rd-26th, 2018, in Las Vegas, Nevada. Join Cortec® MCI® (Booth # S-12051) at the Las Vegas Convention Center for three days of networking with MCI® experts and keeping up to date on the concrete industry. Jessi Meyer will host a special "Lunch and Learn" on Wednesday, January 24th, for MCI® reps and distributors. Space is limited, so RSVP online now at <https://www.cortecmci.com/events/>.

To receive a \$20 exhibits-only admission to WOC (regular rate is up to \$90), register online through ICRI (<http://www.icri.org/event/WOC2018>) by January 11th, 2018, and use promo code A36. Or register through ACI with promo code A21 (https://www.compustystems.com/servlet/ar?evt_uid=163&PromoCode=A21).

ICRI MN Mega Demo

"Evolution of Repair"

January 11th, 2018

Cement Mason's Training Center

New Brighton, MN

<http://icrimn.com/upcoming-events>

World of Concrete

January 23rd-26th, 2018

Las Vegas Convention Center

Booth # S-12051

Las Vegas, Nevada

<https://www.worldofconcrete.com/en/attendee.html>

2018 ICRI Spring Convention

"Seismic Solutions"

April 11th-13th, 2018

San Francisco, California

http://www.icri.org/?page=conven_sp2018_home

Spring 2018 ACI Concrete Convention and Exposition

"Concrete Elevated"

March 25th-29th, 2018

Grand America & Little America

Salt Lake City, Utah

<https://www.concrete.org/events/conventions.aspx>

NACE CORROSION 2018

April 15th-19th, 2018

Phoenix Convention Center

Booth # 1003

Phoenix, Arizona

<http://nacecorrosion.org/>

ICRI MN Chapter Golf Tournament

July 24th, 2018

Edinburgh Golf Course

Brooklyn Park, Minnesota

<http://icrimn.com/>

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