



MIGRATING CORROSION INHIBITORS
FROM GREY TO GREEN

December 2016

Cortec® MCI® Still Excelling after More than 30 Years of Enhancing Durability Globally!

Thirty years ago in 1986, MCI®-2000 was used in the patch and overlay repair project of the Randolph Avenue bridge deck. This bridge is located in Saint Paul, Minnesota, a region noted for its harsh winters and heavy use of deicing salts, making it a prime study on the corrosion protection of MCI®. MCI® was used in the westbound lanes but not in the eastbound lanes, allowing an important corrosion comparison to be made. Periodic readings showed corrosion rates to remain low in the MCI®-treated side, while corrosion rates in the control side took a sharp increase into the active corrosion range in 2007. The results were reported in a 2011 NACE paper showing that MCI® continued to reduce corrosion rates and extend the durability of the treated side.

After more than 30 years of commercial use, Cortec's MCIs are still going strong. From the patenting of Cortec's amine alcohol MCI® to the development of more advanced amine carboxylates, many of which

have had NSF/ANSI Standard Certification for use in potable water tanks, Cortec's MCI® Technology continues to grow. MCI® products today include a variety of admixtures, surface treatments, repair grout and mortars, and post-tensioning corrosion inhibitors. Greater advances are expected in the future as Cortec® researches and develops new MCI® products!

MCI® Technology continues to adhere to high standards of performance and recognition (M-82, ASTM C1582 performance; ICRI, ACI credits).

MCI® has been used globally to enhance the durability of many different structures in a variety of corrosive environments—from the deicing salts of MCI's frigid Saint Paul, Minnesota, hometown to some of the world's most corrosive soil and seaside environments in the Middle East. Here is a sampling of repairs and new construction from our case history files over the years:

Project	Location
Charleswood Bridge Restoration	Canada
Pentagon Restoration of Exterior Walls	Washington, DC
Cooling Tower Repair	Hungary
Ponte Po Bridge Repair	Italy
Melide Viaducts	Switzerland
Gerland Stadium Repair	France
Railroad Bridge Repair	China
Naval Station Repair	Greece
Black Sea Bridge Repair	Russia
Randolph Street Bridge Deck Repair	Saint Paul, Minnesota
Facility Building Façade Restoration	Croatia
Francis Scott Key Bridge Repair	Baltimore, Maryland
Kriel Power Station Repair	South Africa
New Drinking Water Reservoir in Guayaquil City	Ecuador
Emergency Stabilization of Alcatraz	San Francisco Bay, California
North Kahana Stream Bridge	Oahu, Hawaii
Sharira Water Tower Preservation	Israel
Al Jalila Children's Specialty Hospital Construction	UAE
Water Reservoir Construction	Spain
World's Tallest Building Construction	UAE



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In the News

MCI®-2005 Builds Sustainability and Durability

Sustainability, or “Green Building,” has become an important goal as builders around the globe seek to reduce consumption of cement, energy, and water while building with renewable resources. Too often, however, the structure’s durability and service life is taken for granted. This consideration is of critical importance in the selection of building materials that will contribute to the durability and ultimate sustainability of the structure in order to preserve important resources in the long run.

Selection of the right materials for durability is especially critical for the sustainability of structures built in extremely corrosive environments like those in the Middle East. This climate offers an extreme example of the harsh corrosive elements that can attack structures below and above ground. For instance, buildings in coastal areas are exposed to high humidity and salt spray aboveground. Below ground, concrete foundations are at risk from groundwater and mineral deposits of greater salinity than seawater. In such conditions corrosion can easily begin on embedded rebar, causing expansion and leading to concrete cracking, spalling, and deterioration.

To counteract this process and promote greater durability and sustainability even in the midst of extreme conditions, Cortec’s MCI®-2005 Patented admixture has served as an important addition to a number of new structures in the Middle East. Not only does it add to the durability of structures by forming a protective molecular layer on rebar for protection at both the anode and cathode; it is a USDA Certified Biobased Product made from 67% biobased content for added sustainability. MCI®-2005 is also NSF Standard 61 approved for use in potable water tanks.



When considering durability for the world’s tallest building, Burj Khalifa Tower in Dubai, UAE (a country that developed its own “Estidama” sustainability guidelines), builders chose MCI®-2005 in their search for materials that would help the tower achieve its 100-year design life. The structure is 828 meters (2,716 feet) tall and built on a concrete and steel podium that has 192 piles descending more than 50 meters (164 feet) into the ground. MCI®-2005 was added to the substructure as an additional protection against harsh groundwater conditions.

The use of MCI®-2005 in structures such as Burj Khalifa is an important step toward achieving sustainability in terms of durability and the use of renewable materials. MCI®-2005 meets both requirements. By inhibiting corrosion through the use of a biobased product, MCI®-2005 plays an important role in increasing the durability

of the structure, leading to fewer repairs, greater structural integrity, longer service life, and a more sustainable structure!

Cortec’s MCI®-2005, Patented conforms to the following standard test methods: NSF Standard 61 by UL (Potable Water Applications Approval), ASTM D-6866-11 (Determination of Biobased Content), and CC- 022 (Electrochemical Impedance Testing).



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Case Histories

MCI®-2005 Used to Counteract Corrosive Soil Conditions for Rove Hotel

Rove Hotel is the first of five budget-friendly hotels located in Dubai Downtown near the world's tallest building, Burj Kalifa. Buildings in the region are challenged by extremely saline soil containing as much as 90,000 ppm of chloride content (for comparison, the Atlantic Ocean contains approximately 20,000 ppm of chlorides). To counteract this highly corrosive environment, MCI®-2005 admixture was used in more than 5,000 cubic meters of substructure concrete. The admixture was specified due to ease of application and ability to improve service life. After the building of Rove Hotel, three more hotels were completed according to the same design.



Courtesy image from thedubaihotels.com

Preserving a Croatian Overpass

An overpass in Osijek, Croatia, became a good example of how Cortec® MCI® surface treatments can be used to preserve structures from corrosion while also improving their general appearance.

After the concrete surface was water-blasted to remove dirt, oil, and grease, MCI®-2020 Powder was brushed on the surface and allowed to dry for 24 hours. This is an especially powerful corrosion inhibitor containing the strongest concentration of MCI® available in a topical treatment. The MCIs form a protective layer directly at the surface of the rebar that will still protect should the concrete surface become cracked and allow the ingress of corrosive contaminants as typically occurs. In addition, it is organic, safe, environmentally friendly, and free of calcium nitrite.

For additional protection and a fresh clean look on the overpass, MCI® Architectural Coating RAL 7035 (Gray) was applied on top. This topcoat combines Migrating Corrosion Inhibitors with added sealant protection to guard against the ingress of moisture, chlorides, and other contaminants. This treatment was an important forward-looking step and will lead to increased durability and service life of the structure for the local citizens of Croatia.



MCI®-2020 Powder has proven effective in the Strategic Highway Research Program (SHRP) funded by the U.S. federal government and state DOTs. MCI® Architectural Coating decreases the chloride-induced corrosion rate of metal reinforcement fourfold, based on Cortec® Project ##00-285-4431.



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MCI® Education

Cortec® VP of MCI® Sales Contributes to ICRI Event

As an active member of the International Concrete Repair Institute (ICRI), Jessi Meyer, VP of MCI® Sales, took her place at the Fall ICRI convention November 9th-11th in Cleveland, Ohio. In addition to hosting a tabletop presentation of Cortec® MCI® products, she also participated in a number of ICRI meetings such as the Corrosion Committee, Marketing, and the Service Life and Durability Committee.

Cortec® Shares MCI® Technology Solutions at World of Concrete Pavilion – Toronto, Canada

Cortec® was grateful for the invitation of StrataWORKS Canada to join them at their World of Concrete Pavilion booth November 30th-December 2nd in Toronto, Canada. Ashraf Hasania, MCI® Technical Sales & Market Manager for Canada, represented Cortec® and was able to share MCI® Technology solutions with engineers, concrete specialists, and concrete additive manufacturers who stopped by the booth.



Upcoming events




JANUARY 17-20, 2017
LAS VEGAS, NV
BOOTH # S11148
<https://worldofconcrete.com/>



MARCH 15-17, 2017
"BRIDGES AND HIGHWAYS"
MONTREAL, QUEBEC, CANADA
http://www.icri.org/event/2017_SpringConvention



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