



MIGRATING CORROSION INHIBITORS
FROM GREY TO GREEN

NEWSLETTER

World of Concrete 2014

The 2014 World of Concrete is just around the corner – January 21-24th, 2014 in Las Vegas, Nevada! Once again, Cortec® will have a booth in the South Hall – **S10455**. We are also planning a rep and distributor meeting for Wednesday, January 22nd during lunch. Please mark your calendars and watch for more information coming soon!



Case Histories

Holot Water Tower Preservation

Holot Water Tower in Rishon-Le'zion, Israel, had developed cracking and leaks due to corrosion over its 40 year life. These problems made repair necessary. In 2011, Meniv-Rishon LTD together with Yitzhak S. Lameey Engineers and Glimmer Industrial Consultation specified the use of MCI®-2020 as a part of the rehabilitation project.

The contractor, Lesico LTD, removed all delaminated, unstable concrete. Exposed reinforcing steel was cleaned and new concrete patches were placed. The entire structure was then treated with two coats of MCI®-2020 with a total dosage rate of 3.68 square meters per liter (150 square feet/gallon). Following MCI®-2020 application, bi-component PU paint was applied.

MCI®-2020 was chosen over the competitor product (Ferrogard 903) due to its superior corrosion protection, better coverage rate with fewer required coats, and UL certification to meet ANSI-standards.





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Case Histories

Sharira Water Tower Preservation

Similarly to the Holot Tower, the Sharira Water Tower in Rishon-Le'zion, Israel, was experiencing cracks and leaking due to corrosion issues. In 2012, Meniv-Rishon LTD together with Yitzhak S. Lameey Engineers and Glimmer Industrial Consultation specified the use of MCI®-2020 as a part of the rehabilitation project.

The contractor, Lesico LTD, removed all delaminated, unstable concrete. Exposed reinforcing steel was cleaned and new concrete patches were placed. The entire structure was then treated with two coats of MCI®-2020 with a total dosage rate of 3.68 square meters per liter (150 square feet/gallon). Following MCI®-2020 application, bi-component PU paint was applied.

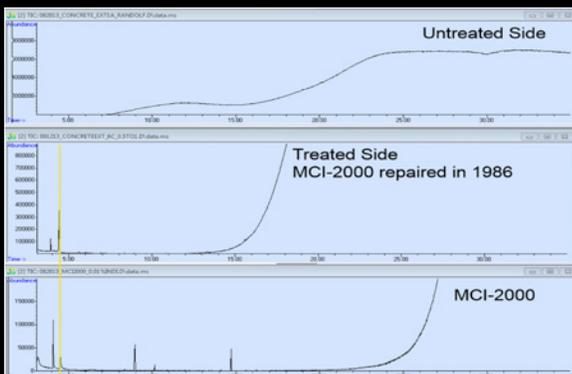
MCI®-2020 was chosen over the competitors due to its superior corrosion protection, better coverage rate, and UL certification to meet ANSI-standards (for use on potable water structures).



Randolph Avenue Bridge Update

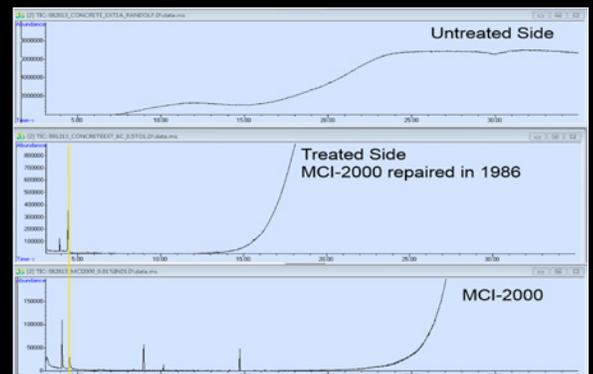
Many of you are familiar with Cortec's oldest MCI® case history – the Randolph Avenue Bridge in St. Paul, Minnesota. A presentation and paper on this long term study was published for NACE in 2011 (a copy can be found here: <http://www.cortecvci.com/Publications/Papers/Nacereviewed/NACE-C2012-1420.pdf>)

Last July, further testing and corrosion rate readings were done on this structure. The testing did not show any significant changes from the 2011 report, however, new testing to verify presence of MCI® was conducted at this time. Concrete cores extracted from the treated and untreated sides of the bridge were sliced and crushed to create a powder for extraction and analysis using GC /MS detection methods. This testing confirmed that the MCI®-2000 is still present in the treated side of the bridge 27 years after application!



Comparison of Chromatograms

A common retention time in treated side and in MCI®-2000



Comparison of Mass Spectra

The treated side showed same compound as the inhibitor in MCI®-2000



New Method for Detecting MCI® in Concrete

MCI[®]s have been used effectively for protection of embedded reinforcing steel for many years. These products can be incorporated as concrete admixtures or as topical treatments on existing concrete structures. Previous studies using x-ray photoelectron spectroscopy (XPS) analysis, show that MCI[®] can migrate through concrete and form a protective layer on rebar that provides protection in the presence of chlorides.

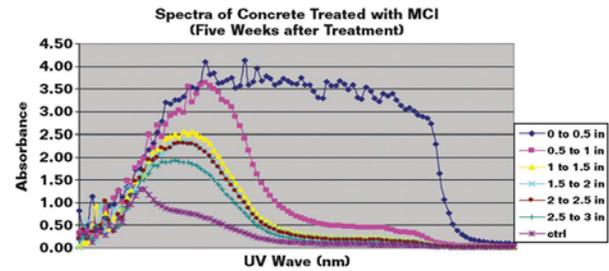
When a MCI[®] is topically applied, there is interest in understanding its migration profile into concrete at a given time. There is also interest in verifying the dosage when a MCI[®] is used as an admixture. Both call for a sensitive detection method. Several challenges affect the development of a reliable detection method – the method needs to be able to detect a minute amount of MCI[®], which is typically dosed at very low rates in concrete; in addition, concrete mix designs vary considerably and concrete itself is highly alkaline.

Past methods used to detect MCI[®] in concrete include:

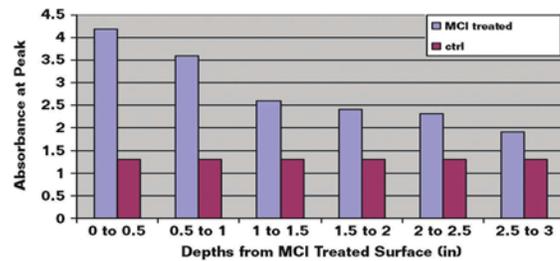
- Alkalinity test by titration
- Quaternary ammonium compound test kit
- Detection of tracers
- Detection using ultraviolet (UV) spectroscopy
- XPS

The latest work focuses on detecting MCI[®] using UV spectroscopy because this type of spectroscopy is routinely used in analytical chemistry and is easily accessible. It also provides the ability to detect low concentrations of MCI[®]. Using UV spectroscopy, MCI[®] was detected at 3 in (76 mm) below the topically treated concrete surface after five weeks. This method also allows for verification of MCI[®] admixture dosage rates. A full paper on this topic can be found here:

http://www.cortecvci.com/whats_new/announcements/Nov.MP.2013.pdf



Spectra of concrete extract at different depths five weeks after treatment.



Progression of MCI migration five weeks after treatment.

MCI[®] Webinar Schedule: For Signed MCI[®] Distributors and Reps

Per discussions at our World Sales Meeting in September, we are changing the time and format of our MCI[®] Webinar Schedule. We have moved the standard day/time to the first Friday of every month, at 9 a.m. central time. Topics to be decided upon, however, we are looking for more input from Reps and Distributors as to what you want to see in these meetings. The next scheduled meeting is Friday, December 6th. Mark Christianson will cover year end/new year updates and training on the new Dropbox/MCI project lists. Please watch your email for a survey on future webinar topics.



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