



NEWS ALERT

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



Photo Courtesy of Adobe Stock - The Nanjing Yangtze River Bridge



MIGRATING CORROSION INHIBITORS
FROM GREY TO GREEN

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).

Cortec® Corporation is the global leader in innovative, environmentally responsible VpCI® and MCI® corrosion control technologies for the Packaging, Metalworking, Construction, Electronics, Water Treatment, Oil & Gas, and other industries. Headquartered in St. Paul, Minnesota, Cortec® manufactures over 400 products distributed worldwide. ISO 9001 and ISO 14001 Certified, and ISO 17025 Accredited.



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.

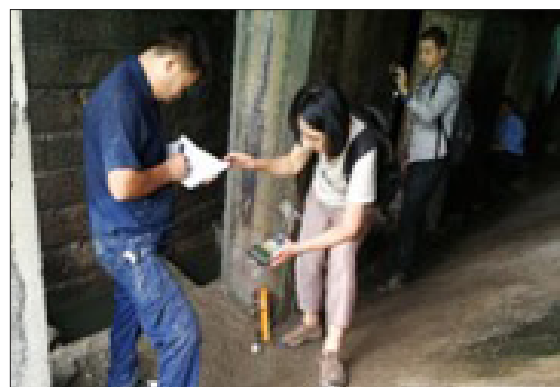
Following the first phase, researchers and engineers will periodically measure the corrosion rates at the structures with MCI® products applied and those without MCI® treatment. In due time in the coming years, corrosion characteristics in these testing areas will be monitored and evaluated. Stay tuned!



Signs of Deterioration after 50 Years



Gathering Baseline Data before MCI® Treatment



Applying MCI® Products

