

Effective bridge preservation with MCI[®] surface protection

Years of improper maintenance and the harsh environment has caused wear and damage to Krk Bridge in Croatia. Cortec's MCI[®] 2020 surface applied corrosion inhibitor was selected to treat salt damage on the bridge before the repair process.

Krk Bridge is a reinforced concrete arch bridge that connects the Croatian island of Krk to the mainland and carries over a million vehicles per year. The longer of the bridge's two arches is the longest concrete arch in the world outside of China.

At an annual cost of around €1-million for regular and extra maintenance, the 1.43 km long bridge requires constant monitoring and maintenance due to its sensitivity. The main threats to the bridge include strong winds causing it to close as well as salt that corrodes the structure. If only one year of maintenance is skipped it is later harder and more expensive to repair. For this reason, the entire reinforced concrete structure of the bridge is continuously monitored and maintained, which is crucial if it is to live up to 36 years of its expected service life.

Preservation project

The improper maintenance and the environmentally negative impacts on the bridge indicated negative results on the supporting bridge structure. Because of the strong winds the bridge has to endure, the salt accumulates on the surface of the reinforced concrete structure and chlorides penetrate through the protective layer of concrete to attack the reinforcement. Investigations carried out by competent institutions concluded that the continuation of this process could endanger the stability of the bridge, and so the preservation project was initiated. The repair is continuously carried out in several phases during the time frame of 30 years.

During the project, several stages are predicted. The field investigation of the current status and the preservation project design was done by IGH, Institute for Civil Engineering in Zagreb. According to the results of the exploratory works, the concrete is mainly contaminated to the depth of the main reinforcement, so the existing concrete is removed to this depth. After the removal of contaminated concrete layer, the cleaned



The Krk Bridge in Croatia, where Cortec's MCI 2020 surface applied corrosion inhibitor was selected to treat salt damage.

concrete surface is treated with MCI[®] 2020, a surface-applied corrosion inhibitor that is designed to migrate through concrete structures and seek out the steel reinforcement bars in concrete.

Repair protection system using Migratory Corrosion Inhibitors

With the agreement of the investor, designer and contractor, it was decided that prior to beginning the repair work, an experimental study would be carried out with materials from five producers in Croatia and abroad.

The compatibility of the repair mortar with Cortec's Migrating Corrosion Inhibitor (MCI[®]) 2020 was tested and proven in a laboratory in Italy. After additional field and laboratory tests, the investor selected MCI 2020, as the product met all the technical requirements of the project and in addition to its superior performance, was the most

economical and easy to apply.

"One of the unique features of MCI is that, if not in direct contact with metals, the inhibitor will migrate a considerable distance through concrete to provide protection. A detailed visual inspection of the condition of concrete and reinforcement is performed first and then the cracks are determined as well as the reinforcement. The determined errors are eliminated by removing the concrete and cleaning the rebars. If the corrosion already started, MCI 2020 is applied. Before applying the mortar, the surface must be moistened until saturated with water before excess water from the surface is removed. It is important to emphasise that the prepared repair mortar that is applied by spraying onto the surface treated with the MCI[®] 2020 inhibitor in a single layer shows excellent adhesion and no binding layer is required," says Ivana Liposcak, technical sales manager: MCI, Cortec. □



Application of MCI[®] 2020 will stop further corrosion of reinforcing metals and extend the service life of the bridge.