

Corrosion-Inhibiting Primer Helps Restore Historic Croatian Monument



The 640 shell holes in the Vukovar Water Tower will remain untouched as a symbol of the city's destruction and its resistance during the Croatian War of Independence in the early 1990s. Wikimedia Commons photo.

The preservation of an historic war-damaged monument, the Vukovar Water Tower in Vukovar, Croatia, was recently accomplished using a novel rust primer with migrating corrosion inhibitor technology. Manufactured by corrosion control technologies group Cortec Corp. (St. Paul, Minnesota, USA), the patented corrosion inhibiting primer is designed to protect the reinforcing metal in concrete from corrosion.

Corroded surfaces of the 50-m (165-ft) tall Vukovar tower were left unprotected and allowed to rust for 23 years after the end of the Croatian War of Independence in 1995. Finally, in early 2018, significant construction work began on the monument's refurbishment.

After mechanically removing loose rust and scale with a wire brush, coating applicators washed the metal surfaces with water to remove excess salt contamination and dust. Then the rust-converting primer—which can be applied to dry or damp surfaces—was applied directly to the

metal surfaces at 3 to 5 mils (75 to 125 μm) of dry film thickness. Since overspray of the primer on the interior concrete surface during repair operations could affect the repair mortar's adhesion to the preexisting concrete, the primer was applied by brush to the Vukovar Water Tower.

The water-based, non-flammable primer combines chelating agents with a high-solids, waterborne latex that has extremely low water vapor permeability. The single-component liquid primer converts rust into a hydrophobic passive layer before coating it with a film-forming latex, which comprises

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After rust and scale were mechanically removed, the rust-converting primer was applied to the heavily corroded metal surfaces of the water tower. Photo courtesy of Cortec.

thickeners and dispersant for protection from additional rusting. The coating can be applied to rusted or poorly prepared steel surfaces where further corrosion protection is required, and where good surface preparation is difficult to achieve. It can be applied at temperatures ranging from 55 to 100 °F (13 to 38 °C) and in environments with hydrochloric acid (HCl), hydrogen sulfide (H₂S), sulfur dioxide (SO₂), and carbon dioxide (CO₂) vapors. It dries within hours and can be topcoated with either water-based or solvent-based coatings.

After curing, the coated rebar has equal or better bond strength to concrete. In salt-spray testing conducted using ASTM B117-16, "Standard Practice for Operating Salt Spray (Fog) Apparatus," the primer provided over 1,000 h of corrosion protection on previously rusted steel parts.

Similar corrosion-inhibiting primer technologies have been used for the construction and rehabilitation of other famous buildings around the world, including the Empire State Building (New York, New York, USA), the Pentagon (Arlington, Virginia, USA), and the Burj Khalifa (Dubai, United Arab Emirates), known as the world's tallest building.

The water tower, long seen as one of the most famous symbols of the city's suffering during the war's Battle of Vukovar, will not be restored to its original function. Instead, it will become a memorial site.

Source: Cortec Corp., www.cortecvci.com.

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