



LIFTING THE LID
The training/
certification
conundrum

UP FRONT
All hail graphene

IN FOCUS
Dry ice cleaning



POST-TENSION STRANDS PROTECTION

Cortec's corrosion control technology protects PT tendons from corrosion before grouting

The St Croix Crossing is a significant new structure connecting Oak Park Heights, Minnesota, with St Joseph, Wisconsin. The new bridge is expected to promote regional economic development and reduce congestion by replacing the historic but aging Stillwater Lift Bridge (destined for pedestrian traffic), with an engineering masterpiece. The new crossing is designed to carry tens of thousands of vehicles across the St. Croix National Scenic Riverway every day.

Due to its unique environment, the approximately one mile long crossing was specially designed as an extra doped bridge (combination box girder and cable stay bridge) to minimise the environmental and visual impact of the structure on the St Croix River Valley. As one of only two of its kind in the US, it is a model of engineering and design ingenuity. Cable stays support the bridge at five pier locations in the river, while approximately 1,000 pre-cast boxlike segments are connected by post-tensioning (PT) cables that are tensioned and grouted in place. PT was also used in the crossbeams connecting upstream and downstream towers at each of the five pier sites.

An unseen but important part of construction was protecting the PT tendons from corrosion before grouting. Grouting is commonly delayed several weeks or months on long-term projects

or when extremely cold winter temperatures interrupt continuous grouting. State and federal requirements typically call for corrosion inhibitor application if the waiting period is two weeks or longer.

The Lunda/Ames Joint Venture, a major partner in the multi-year construction of the bridge, chose to extensively apply an easy-to-use, low-toxicity corrosion inhibitor to protect various post-tension strands placed throughout the bridge during construction. MCI-309 is a corrosion inhibiting powder produced as part of a line of Migrating Corrosion Inhibitor concrete protection products from Cortec Corporation in White Bear Township, Minnesota, not far from the new crossing. It has been used to protect PT strands in many important bridge projects across the country, including the Wakota Bridge in nearby Saint Paul, Minnesota.

MCI-309 can be easily fogged through post-tension ducts using a low-pressure air hose after PT strands are placed in the duct. The powder vaporises and adsorbs on metal surfaces, forming a protective molecular layer on the tendons. The layer helps reduce corrosion by inhibiting interaction with corrosive elements such as air, moisture, and chlorides. As a mixed inhibitor, MCI-309 discourages both cathodic and anodic corrosion reactions from taking place on the tendons. Little or no surface preparation is required before application, and the MCI-309 does not need to be flushed out before grouting, reducing labour. MCI-309 can provide up to 24 months of continuous protection. ■