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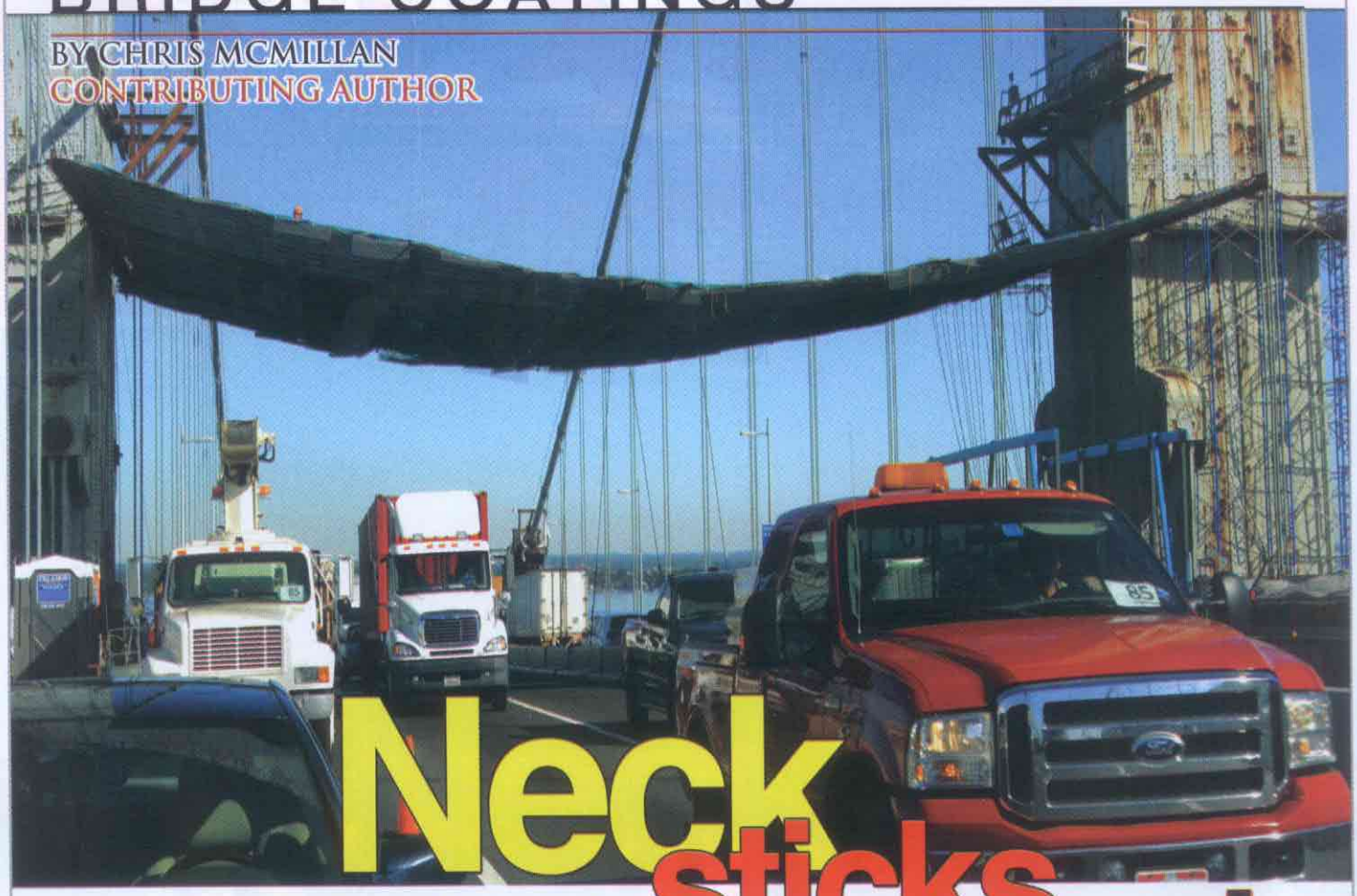

Neck sticks out

New technologies place special tag on Throgs Neck Bridge

In 1945, famed New York City bridge designer Othmar Ammann was commissioned to design a state-of-the-art suspension bridge that would connect the Throgs Neck section of the Bronx with the Bayside section of Queens, carrying traffic between the New England Thruway, George Washington Bridge and Long Island.

Unlike many of the bridges of that era, which used a streamlined, plate-girder system, Throgs Neck used a newer design technology that consisted of 28-ft-deep stiffening trusses under the deck, essentially weighting the bridge to allow wind to simply blow through the span instead of against it. Additionally, the rather low shorelines of the Bayside and Throgs Neck rivers required that long, curved approaches be added to the design in order to allow adequate clearance for water traffic beneath the span. Deck-raising began at the towers until crews met at the center and then extended out to the approach viaducts. Interestingly, the bridge's manager, Robert Moses, possessed an antipedestrian philosophy, so Throgs Neck was designed without pedestrian access of any kind.

Upon opening on Jan. 11, 1961, the new 13,400-ft-long suspension bridge offered motorists six lanes of traffic, three in each direction, relieving congestion on the adjacent Whitestone Bridge, which opened in 1939. Today, nearly 50 years after its grand opening, the Throgs Neck Bridge will again use new technologies to rehabilitate the structure and revitalize its appearance for the approximately 120,000 cars that travel over the bridge each day.

Blast off

In November 2006, renowned industrial bridge painting contractor Corcon Inc. of Lowellville, Ohio, was awarded the nearly $40 million Throgs Neck revitalization contract by the Metropolitan Transit Authority's Bridge and Tunnel agency. The

three-year project will include performing structural steel repairs, main cable and suspender rope investigations, catwalk replacement, coatings application and containment of the existing lead-based coating system. Corcon's goal is to beat the three-year project completion deadline by at least one year, using a variety of advanced engineering, equipment, surface preparation and coating technologies made available through their network of suppliers, as well as extra manpower.

Most of the work will be executed from barges by two blast crews and three paint crews inside tented containment areas along the 2,910-ft span. The containment areas are erected by enclosing the sides of the bridge completely with canvas curtains and then creating bulkheads between the side tarps every 40 ft, or the length of two 20-ft sections of the floor truss.

Surface preparation on Throgs Neck began in spring 2007, with an SSPC-SP10 near-white abrasive blasting using recyclable steel grit. The blasting crew consists of six blasters, three vacuumers, one safety spotter and one machine operator positioned on the barge. The spotter is in constant communication with the barge operator, while also watching and helping each crew member inside the containment area.

Using state-of-the-art Advanced Recycling System (ARS) units placed on barges near the span's towers, the steel grit is blasted though a bank of three air compressors operating at 1,600 cfm and then recycled through the unit's powerful vacuum blowers operating at 6,500 cfm. These units have the capacity to reach surface areas near the middle of the bridge, more than 1,000 ft away from the ARS unit.

Another ARS technology being used is the modular dust collectors. These units are placed both on top of the bridge's parapets and behind the concrete barricade, collecting debris at 30,000 cfm and providing a more-than-adequate airflow for dust and lead control in each containment area. This provides a tremendous time savings advantage because typical dust collectors used for a project of this size are very large and would have to be placed on barges with large-diameter air ducts connecting to the containment. The containments themselves also would have to be much smaller in order to meet proper airflow requirements in accordance with OSHA regulations. At the distances the blast crews are working, this would be nearly impossible. Blast crews will use approximately 245 tons of recyclable grit to remove the span's old lead-based coatings. Approximately one-half of the surface preparation work was supposed to be completed by mid-October, based on the current schedule of cleaning and priming 40 ft of the span's length every three days.

On the triple

International Paint LLC was one of five coating manufacturers specified to bid on the project. After meeting rigorous product performance criteria, the coatings contract was awarded to International Paint, with the three-coat system of coatings to be applied after the surface preparation is completed. The select-

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ed systems were tested rigorously against the AASHTO R31 requirements. AASHTO R31 is a recommended practice for the evaluation of coating systems with zinc-rich primers specifically designed for use on iron and steel surfaces.

This specification tests various properties of each product to be used in the coating system ranging from wet paint physical properties to long-term corrosion resistance and UV durability of the coating scheme. As part of the corrosion and UV testing, two primary tests are employed: ASTM B117 and ASTM D5894.

ASTM B117, more commonly known as "saltfog" or "saltspray," is a recognized industry standard for corrosion testing, though some deem this standard to be archaic and prefer the ASTM D5894 test instead. ASTM D5894 is a cyclic corrosion test incorporating both corrosion testing and UV exposure, methods which more closely resemble "real world" field conditions. Both color and gloss retention is reported as part of the ASTM D5894 protocol.

AASHTO R31 also evaluates other aspects of the coating scheme to validate its robustness, like abrasion resistance to determine how resistant the topcoat is to abrasive damage and freeze-thaw stability to ensure that the coatings can withstand some of the wide temperature ranges experienced around the country.

While coatings typically represent a fraction of the cost of a project of this size, they can play a significant role in extending the life of a bridge, saving millions in maintenance costs long term. For example, after painting Throgs Neck's two 347-ft towers, Corcon will apply an advanced, highly durable polysiloxane high-gloss finish to help retain their color and resist fading for up to 25% longer than tra-

ditional topcoats. Though Interfine 979 has been successfully used on high-profile bridges and other commercial projects across the globe, Throgs Neck is the largest U.S. project by International Paint to utilize this coating technology.

Polysiloxane technology works because of the inorganic nature of its bonds. A chemical bond is the link that holds the atoms together. Every bond between atoms has a specific resistance, or bond strength, to the effects of nature (i.e., chemical attack, attack via sunlight and attack from water, which if it reaches the steel substrate may cause corrosion underneath the coating). The main bond in polysiloxane is silicone-based, whereas the bond type in the majority of organic coatings such as polyurethane and epoxies is carbon-based, which is more susceptible to the effects of sun and weather.

New coating technologies also can help save significant time, both in the ease of use and the physical application process. For this project, paint crews will spray-apply a three-coat system of high-performance primer and intermediate color on the lower portions of the span, both of which do not require any induction time. With micaceous iron oxide added to the intermediate color to ensure better edge protection, only minimal repair work to any damaged areas of the bridge will be necessary. The final urethane finish will allow superior coverage at a lower film thickness. And because the formulations are designed to perform just as well in colder temperatures, they can help extend the painting season in areas of the country that have more extreme temperature patterns.

In all, more than 30,000 gal of paint and topcoat will be used to repair and revitalize Throgs Neck's 1.7 million sq ft of steel. Ongoing on-site technical support also will be provided by International Paint, as well as NACE-certified coatings inspectors.

Other repairs being made to Throgs Neck Bridge include removal of the cable wrapping to expose the thousands of wires inside that make up the main cable. This work is being performed by Corcon's subcontractor, GCCCM Construction Co. Inc. of Rushing, N.Y. Once the wrapping is removed, the owner and consultant engineers will take samples and determine the condition of the main cables. The contract also calls for the replacement and testing of select suspender cables.

As the road and bridge industry seeks long-term strategic solutions for preserving and revitalizing the nation's older bridges, while constructing newer bridges to accommodate population growth, new technologies must be utilized to help the industry achieve better time and cost-efficiencies, environmental compliance and profitability. R&B

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