Something Old—Something New

Wichita restores historic bridge.

By Abdul Hamada

The Minisa Bridge, a historic structure in Wichita, KS, was restored to its original condition by the city in a project that engaged the local community in the restoration. Designed by Wichita architect Glenn Herbert Thomas (1889-1962) with Lawrence W. Byers, the four-lane bridge over the Little Arkansas River was constructed in 1932, shortly after the completion of the now historic North High School in Wichita.

Conceived to harmonize with the iconography used on the school structure, the bridge heads feature Native American-themed images including buffalo, sunflowers, and human figures. The guard rails are interspersed with buffalo figures executed in green, blue, and buff-colored Carthalite relief panels. Piers constructed of cast concrete blocks with busts of Native American and buffalo heads flank the bridge entrance on both sides. The decorative work on the bridge was executed by Bruce Moore who also designed a statue of General William Mitchell for the Smithsonian Air and Space Museum in Washington, DC.

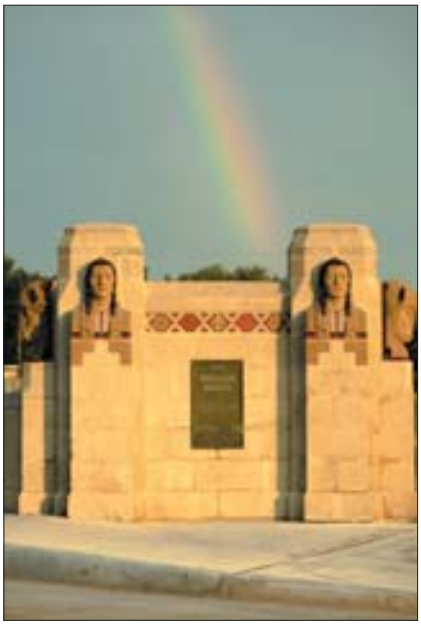
In December 2005, Wichita commissioned Parsons Brinckerhoff (PB, www.pbworld.com) to provide plans for the rehabilitation of the historic bridge. Due to heavy traffic—about 17,000 vehicles cross the bridge every day—the sub-deck as well as the brick paver surface showed signs of distress with large heaves, holes, and cracks creating hazards for motorists. Sidewalks and ornamental handrails as well as other architectural and structural elements of the bridge were also in dire need of repair. The bridge was structurally deficient and functionally obsolete at that time due to its narrow roadway width and poor condition of the superstructure.

Given its historic status and importance to the local community, replacing the existing structure with entirely new construction was not an option. The goal was to increase the bridge's structural capacity while preserving all its historic elements. Careful surgery had to be performed close to the parapets, which is where the historical elements are located, stabilizing them with piles on the outside until the new structure was complete and could be tied to the bridge heads.

To maintain the historic aesthetics of the structure, the paving brick riding surface was replaced with similar-looking new bricks.

To expedite construction—the contractor had only six months to complete the project—shallow depth prefab beams were specified, so-called K2 sections that can span up to 55 ft. The shallow depth saved time and mimicked the old cast-in-place concrete superstructure depth. Heavily reinforced abutments were reconstructed from the foundation up to make the members more resilient and to minimize future deterioration. Large portions of the old abutments that were not reinforced were removed.

Piers were kept in place during the patching of the substructure, and the deteriorated portions removed and replaced with new epoxy concrete to lend additional stability. A drainage system was added on the riding surface below the paving bricks to minimize the destructive effects of the extreme weather conditions in this part of the country.



A four-lane structure over the Little Arkansas River, the Minisa Bridge was originally constructed in 1932.

Design allowed for the extension of an existing bike path under the bridge. Note the buffalo head sculptures that flank the bridge entrance.

Having the original plans for the bridge saved quite a bit of time. They provided an accurate picture of the foundations and the number of piles under the bridge, which helped determine how to redesign the substructure according to current standards, while maintaining the necessary loading capacity. This was particularly important since it was decided the original footing would be preserved.

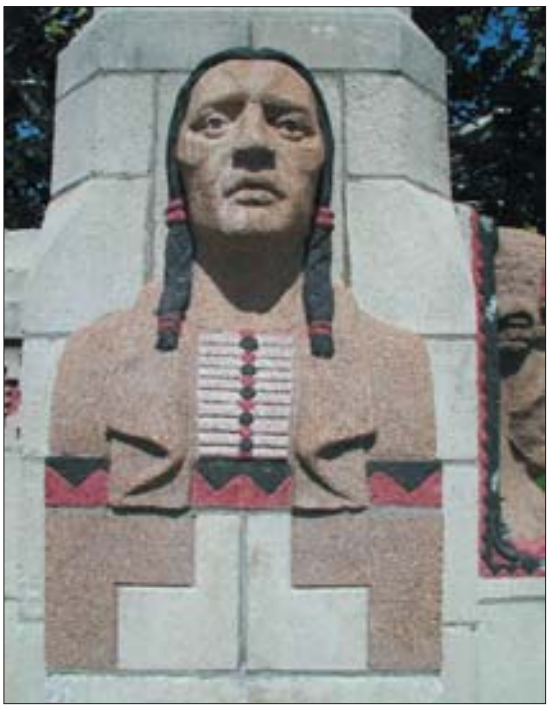
The badly damaged paving brick riding surface was replaced with similar-looking new bricks to maintain the historic aesthetics of the structure. The decorative historical elements on the parapets were boxed during the entire construction process to protect them from potential damage from construction activities and heavy equipment.

In addition to making the structure safe for motorists, the design allowed for the extension of an existing bike path under the bridge. Since the construction site was so close to a high school, it was important to maintain some form of pedestrian access during the construction phase.

To restore the bridge to its original splendor, Wichita and PB worked closely with U.S. Heritage (www.usherheritage.com) during the design process, while writing specifications, and when selecting a contractor that would be able to take on such a challenging project. Apart from demonstrating their expertise in historical restoration through models of previous work, potential contractors were required to document the process of preservation during construction to provide for any future restoration efforts the city would undertake. Oakland Ave Craftsmen Company (Wichita) was ultimately chosen to serve as subcontractor for the project restoration work.

Since many of the existing materials were not in stabilized condition, the contractor had to remove the root material as part of the cleaning and repointing process. The existing mortar was replaced with a special material imported from Europe that will allow the masonry structure to breathe, enabling moisture to penetrate and exit without creating structural cracks and lesions.

In several instances, pieces that were missing from the sculptural elements at the parapets had to be replicated and carefully attached. Artisans created custom molds for each element, then shaved them to fit the shape it had been when first constructed



Sculptural elements on the parapets were restored. Often, pieces that were missing had to be replicated by artists using custom molds, carefully attached, and then shaved to fit.

Restoring Carthalite

Apart from its decorative elements, the Minisa Bridge is notable for its use of Carthalite, a material unique to Wichita, the only place it has been manufactured. Known for its longevity and beauty, Carthalite is a cast stone, a man-made compound of yellow concrete sand, coarse river gravel, white cement, water proofing, water, and crushed glass. Its name was intended to evoke Carthage limestone.

More than a dozen structures in the city feature the material, including the Kansas Aviation Museum, a former synagogue that is now home of the First Metropolitan Community Church, as well as the former Dockum Drug Store. The reconstruction of the bridge's original Carthalite was probably the most essential aspect of the restoration effort, and a process that required dedication and ingenuity.

Research on the bridge had shown that the original artisans combed junk yards and trash piles to locate bottles and containers made of colored glass of the period. This glass was then used to strengthen the concrete and

create the deep, brilliant hues of the decorative artwork for which the Minisa Bridge is known.

To recreate those vivid hues, Wichita asked members of the community to donate any 1930s-era red, white, or blue glass they might be able to locate in their basements or attics. To generate sufficient material for the project, five gallons of each color of crushed glass were required. The city conducted a press conference and advertised in the local paper and on TV to publicize the need for the historical glass. The public responded and brought the glass to a booth at the high school near the bridge site. Some of the citizens that donated glass had a strong connection to the bridge, noting that their parents had participated in the original construction in 1932.

Following a six-month closure, the bridge partially reopened to traffic in early August 2008 and was completely opened on September 23rd during a ceremony attended by Mayor Carl Brewer and other local dignitaries. The mayor gave a special speech thanking the entire project team, as well as the Wichita Director of Public Works, City Engineer, and City Historic Preservationist. He noted that the project had been well executed and that the bridge was open to traffic one month ahead of schedule and on budget.

Given the community involvement and the valuable research gathered in the restoration process, the rehabilitation of the Minisa Bridge was more than just an example of careful and creative engineering. It was an opportunity to make residents of the region aware of the architectural significance of the bridge and allow them to become active participants in sustaining the area's heritage. GE

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