

STEEL Hits Home Run

in Macombs Dam Bridge Rehabilitation



When the original Macombs Dam Bridge was built back in 1814, Yankee Stadium was barely a glimmer in Babe Ruth's eye. But over the years, since the opening of the Stadium in 1923, the bridge became such an important lifeline for Yankee fans that when the bridge was to be recently rehabilitated, the construction schedule was arranged around the World Champions' schedule.

The contract, in fact, was written around it. It specified that no work could be done on the \$140 million project from opening day for the New York Yankees (April 1) until five days after the team's last presence in the Bronx in the fall.

Jake Bidosky, vice president of Pearl River, N.Y.-based American Bridge Co., one of the two firms that made up the general contractor joint venture on the project, Schiavone Construction Co. / American Bridge Co., said, "We had to replace roadway decks in their entirety while maintaining traffic in both directions. And the work could only be done during Yankee off-seasons.

Further complicating the work plan was a penalty and incentive program for each stage of the project that called for a "fine" of \$100,000 per day for every day the bridge wasn't open after March 31. The incentive part of the contract called for a bonus of \$50,000 per day for each day work was completed before March 31, up to a maximum of 40 days or \$2 million.

The first stage of the rehabilitation proved especially challenging due to \$6 million in "surprise work" following the discovery of deteriorated structural steel members that were revealed when the existing bridge deck was removed. Luckily, stage two of the renovation, which called for the replacement of the middle section of the roadway, held fewer surprises. As a result, the contractors were able to complete their work 39 days ahead of schedule, an accomplishment that netted them a bonus of \$1,950,000.

Rehabilitation work in the third stage involved replacing or repairing deteriorated structural steel members and while the work was not as extensive as in the first stage, a "disastrous winter" permitted completion precisely on March 31. There was neither a bonus nor a penalty as a result, but the contractors met their contractual obligations to the NYC DOT and best of all, to the delight of the Yankees and their fans, the bridge was open to traffic just in time for opening day last spring.

A Complex Undertaking According to David LeRoy, the principal-in-charge and project manager with Modjeski and Masters Inc., the project's Mechanicsburg, Pa.-based design engineer, the project was unique because it involved many different types of structures and systems. Main program elements entailed repairing, redecking and strengthening the half-mile-long bridge complex, including its approach spans and swing bridge over the Harlem River. The project included approach spans on the Bronx side, the I-87 Interchange and replacement of the mechanical and control systems.

Much of the steel replaced in the project consisted of small pieces, such as bracing members, angles, small beams for sidewalk supports and corroded steel members near deck joints. All of the new steel in the project, except for the bearings, was A-36 steel. Approximately 950 tons of steel have been replaced and 2,300 tons of new steel have been added to the bridge.

Overall, the project consists of six different bridge structures totaling about 3,500 linear feet and 1,100 linear feet of ramp structures. In addition, an estimated 9,600 square feet of steel grid deck was installed (along with concrete overlays) on the turn-of-the-century bridge complex. A 1,600 linear foot steel safety barrier has been

installed as has 2,400 linear feet of new steel railings and 6,300 linear feet of new steel protection screens.

On the swing span bridge and a camelback structure, 136 new eye bars were installed to add redundancy. In addition, a 210-foot-long temporary steel bridge was constructed to tie in the 155th Street viaduct structure and the western approach.

LeRoy noted that although a large amount of steel used was in the project, there was little opportunity to take advantage of higher strength steels because it was necessary to replace the steel in kind.

"What was incorporated into the bridge at many locations, however, were steel reinforcement plates," he pointed out. "And in 68 locations, where older steel members that were composed of two eye bars each lacked sufficient redundancy under today's building code, two additional eye bars were added.

In many cases, steel falsework structures were needed to support the span while major structure elements were repaired or replaced. According to Bidosky, "Anytime you repair or replace steel members on very old city structures, actual field measuring of the structure becomes critical due to either a lack of original drawings or previous contracts in which drawings were unavailable, even from archives."



The roadway decks were replaced in their entirety while maintaining traffic in both directions and the work could only be done during Yankee off-seasons.



At \$140 million, the cost of the bridge rehabilitation is awesome when compared with the \$1.8 million construction cost of the original bridge almost two decades ago.

When it comes to aging structures, this one is of particular note. Built in 1895, the recently rehabilitated bridge is actually the third such structure on the site. The first Macombs Dam Bridge was built in 1814, rebuilt in 1861 following a boating "accident," which tore a hole in the dam, and, following serious deterioration, rebuilt once again in 1895. And just like Yankee Stadium ticket prices, which have soared along with inflation over the past eight decades, the cost of this rehabilitation project at \$140 million is an awesome figure when compared with the \$1.8 million construction cost of the original Macombs Dam Bridge, almost two centuries ago.

While minor rehabilitation work continues on the bridge (the contract was extended by 367 days to perform additional work to repair existing deteriorated steel members that were not stage critical), by the next opening day contractors will have hit their own home run! Hopefully the Yankees can do the same. ■

MACOMBS DAM BRIDGE

Owner **New York City Department of Transportation, NYC**

Design Engineer **Modjeski and Masters Inc., Mechanicsburg, PA**

General Contractor **Schiavone Construction Co./**

American Bridge Co., a joint venture, Bronx, N.Y.

