I-88 Fox River Bridge

North Aurora, IL

Officials at the Illinois State Toll Highway Authority wanted to maintain the state's only arched bridge during a widening and rebuilding of the I-88 Reagan Memorial Tollway in North Aurora, Illinois. The final precast design, which added a second bridge of similar design alongside the original, proved so effective that Tollway officials decided to replace the existing bridge, too.

The goal was to increase capacity to three lanes from two lanes in each direction, using the original arched bridge, which opened in 1958, to carry three westbound lanes while the new bridge carried three eastbound lanes. The new bridge features 10-spans, comprising five spans of precast concrete Illinois I-beam girders, plus five spans of precast concrete open-spandrel arches onto which were placed precast concrete I-beams. Epoxy-coated reinforcing steel (ECR rebar) was used in the project for corrosion protection against deicing salts, as well as due to the project's water crossing.

Each concrete arch was fabricated in two pieces about $1^1/_2$ miles from the site in a yard created by the contractor. They were cast on their side and then lifted and rotated into a vertical position using a device constructed for the project. The pieces were delivered via special heavy-load semi-trailers with 13 axles, rear steering, and 90-ft-long flatbeds.

The arches were installed from each bank, eventually meeting in the center. A detailed crane-pick location plan was developed to accommodate the erection of the arches so that river flow could be maintained,

The challenges faced on this project made the construction crew better able to understand the changing dynamics of the Fox River, which came in handy almost immediately. Upon seeing the quality and design of the new structure, Tollway officials decided to replace the existing arched bridge rather than rehabilitate it. The new westbound span was completed in March 2010.

Team

Owner:
Illinois State Tollway Authority

Designer:
Janssen & Spaans Engineering Inc.

Builder:
James McHugh Construction Co.

Design Criteria:
– 1,345-ft, 10-span bridge

– Five spans of 42- and 54-in.-deep precast concrete Illinois I-beam girders and five 178-ft spans of precast concrete open-spandrel arches.

– 36-in.-deep precast concrete I-beams placed on spandrel arches.

– Six lanes of traffic (three in each direction).

– Performance-based delivery system similar to design-build.

- Construction began July 2007.

– Original bridge removed and replaced with similar design once first bridge completed.

Total Project Cost: $44.5 million (including Route 31 ramps and overpass)

Total Size: LENGTH: 1345 ft