GILA RIVER INDIAN COMMUNITY

Gila River Bridge Replacement

by Shawn Sheble, FNF Construction Inc., and Mark Chase, AZTEC Engineering

Completed Gila River Bridge. Photo: Greg Harasba.

Replacement of the Gila River Bridge on the Gila River Indian Community in Arizona was a construction manager/general contractor (CM/GC) project administered by the Gila River Indian Community Department of Transportation (GRIC DOT). The purpose of the project was to replace the existing Sacaton Road (Route 7) Bridge over the Gila River to improve roadway safety and hydraulic capacity. The previous 140-ft-long bridge was built in 1961 with a cast-in-place concrete slab on precast concrete rectangular beams, over a mostly dry river channel. The existing two lane bridge with a clear roadway width of 28 ft was replaced with a new two lane bridge with a clear roadway width of 44 ft.

A Strategic Highway Research Program (SHRP2) grant helped direct how this project was delivered through the use of the SHRP2 toolkit and its emphasis on accelerated bridge construction (ABC) techniques. The GRIC DOT selected a contractor through a qualifications-based selection to work with their designer. The team worked together for several months during preconstruction to revise the design and select a bridge type using ABC methods to minimize traffic disruptions. Much of the success of this project can be tied to a partnering session held after the contractor was brought on board. At this meeting, the project team set project goals and rules of engagement that drove the bridge preconstruction and construction.

During construction of the new bridge, the older span remained open to traffic. The new bridge was constructed in halves, one on each side of the existing structure. This approach was chosen to strategically address two of the project's key goals: reducing temporary works and implementing a simple, effective bridge sliding system. To find a more cost-effective way to replace the Sacaton Road Bridge, the bridge wingwalls were reoriented to run parallel to the abutments instead of perpendicular and they were designed simply as an extension of the abutment caps. In this configuration, they served initially as the temporary supports for half of the bridge and then were re-used as the permanent wingwalls; therefore, no temporary works were required at either abutment and the incremental cost of the abutment cap was less than the cost of a temporary abutment system.

Last segment of bridge sliding into place. Photo: Shawn Sheble.

Another benefit of constructing the new bridge in halves was that the slide system could be much smaller. The Sacaton Road Bridge used a very basic slide system consisting of greased abrasion resistant steel shoes under each beam and a transverse plate to slide on.

One last benefit to constructing the bridge in halves was that one of the halves was actually more than half of the bridge width and therefore heavier than the other piece. This larger half actually served as the anchor from which the smaller half was pulled into final position against its stop, which was the permanent horizontal shear key at the pier and the abutment. Once the smaller piece was set, the larger half was pulled into position using the smaller piece and stop as the anchor. The last steps in the slide process involved lifting the bridge vertically with single acting hydraulic jacks to remove the slide plate, set the elastomeric bearings and place the closure pour in the diaphragms and bridge deck.

The project team was able to successfully design and construct a bridge replacement with just a single weekend closure plus a 9-day full closure as opposed to the estimated 6-month closure required in a conventional construction approach. A very successful SHRP2 Showcase was held where bridge engineers from across the country were able to see the final bridge slide component being moved into place.

From early in the process, all team members had to be on the same page and maintain trust in the other for this to work. This was the case and lead to the completion of the first bridge slide by an Indian community in the country. None of this would have occurred without the guidance and support provided by the Federal Highway Administration Federal Lands Transportation staff, the efforts put out by GRIC staff, their designer, and their contractor.

Shawn Sheble is vice president-structures manager for FNF Construction Inc. in Tempe, Ariz. Mark Chase is a principal with AZTEC Engineering in Phoenix, Ariz.