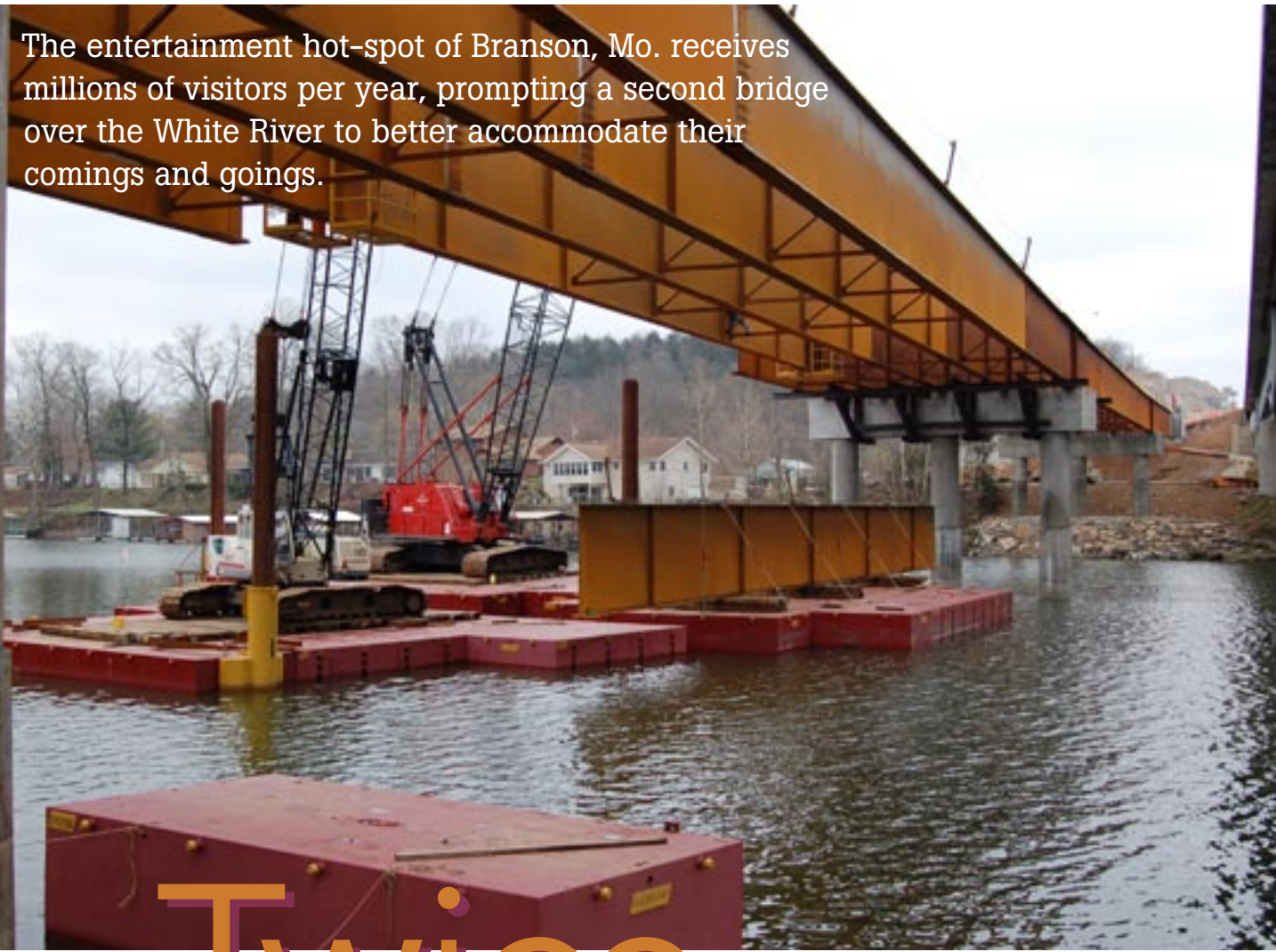


The entertainment hot-spot of Branson, Mo. receives millions of visitors per year, prompting a second bridge over the White River to better accommodate their comings and goings.



Photos courtesy of APAC

Twice as Nice

BY MICHAEL BANASHEK, P.E., S.E.

THE INCREDIBLE GROWTH OF BRANSON, MO. as a leading tourist destination in the Midwest has led to increased traffic congestion on roads into and out of the city. Branson's pairing of outdoor recreation and big-time entertainment attracts more than seven million visitors a year to a town with a population of around 6,000.

An existing two-lane bridge over the White River (Lake Taneycomo) connecting the cities of Hollister and Branson was simply no longer adequate. This developing need prompted the Missouri Department of Transportation (MoDOT) to build a new two-lane companion bridge for U.S. Route 65. The companion crossing is located just east of the existing structure and carries two lanes of northbound traffic, and the existing bridge was reconfigured to carry two lanes of southbound traffic. A limited funding window and compressed construction schedule resulted in the need for an accelerated design schedule. As

such, final plans and specifications were completed within three months.

Built to Match

Route 65 traverses the White River, which acts as the southern border for Branson. The existing bridge is on a vertical sag curve to accommodate high bluffs on each bank. The four-span 823-ft-long structure also crosses Sunset Road and Wilshire Drive, which provide access to homeowners along the river in the project's vicinity. The span arrangement for the new structure was selected to match the existing bridge. The two main spans are 230 ft in length and the bents were skewed at 20° to match the river's flow.

The new bridge's girders feature 108-in. x ¾-in. web plates, and maximum flange sizes over the piers are 24-in. by 2-in. plates.



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The new bridge accommodates a 46-ft-wide roadway and consists of five continuous steel plate girders. The girders are designed composite for live load with a 9-in. concrete slab, and 3½-in.-deep composite precast concrete deck panels were used as stay-in-place elements for the slab. ASTM A709 Grade 50 weathering steel was used to reduce maintenance and eliminate the need for costly painting. The girders feature 108-in. x ¾-in. web plates, and maximum flange sizes over the piers are 24-in. by 2-in. plates. Splices are located to produce 120-ft-long girder pieces weighing 55,000 lb each. Total structural steel used on the project was 1,016 tons, and total cost of the finished bridge was \$4.7 million.

Numerous construction constraints were established in the specifications due to heavy recreational boat traffic on the White River. The design plans included a Boat Traffic Control Plan, which located buoys identifying “Keep Out” and “No Wake” zones. APAC, the contractor, had to maintain a minimum 150-ft-wide channel for watercraft during construction.

Because MoDOT had concerns about sudden water level variations due to the presence of an upstream dam at Table Rock Lake, barge construction was speci-

fied in lieu of a causeway. The 10- to 20-ft channel depth would have required significant rock placement for a causeway and further supported this decision. Barges were not allowed to tie off to the existing bridge—instead they were spudded to the river bottom.

Additional constraints also limited construction activity from the existing Route 65 structure. Lane closures on the existing bridge were minimized due to concerns about heavy traffic on the existing bridge and safety concerns for motorists. APAC was allowed to work from the existing bridge deck for concrete pumping operations for the drilled shaft foundations. In addition, steel girders were unloaded from trucks parked on the old bridge and lifted off by cranes in the river. Other heavy equipment on the existing structure, however, was prohibited.

APAC also devised a means of temporarily bracing the first new bridge girder off of the existing structure during erection. A steel wide-flange beam was used as a compression strut between the girder top flange and the existing bridge's edge of deck. Rubber mats protected the existing concrete deck from damage, and the girder flange was then hooked with a steel chain.

The chain was tightened and secured to the companion bridge, effectively keeping the girder from tipping over during erection. **MSC**

Michael Banasbek is the assistant structural department manager with Horner and Shifrin, Inc.

Owner

Missouri Department of Transportation (MoDOT)

Designer

Horner and Shifrin, Inc., St. Louis

Steel Fabricator and Detailer

Stupp Bridge Company, St. Louis (AISC/NSBA Member)

General Contractor

APAC-Missouri, Inc., Columbia, Mo.

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