



Photo courtesy of MoDOT.

By Greg Law
Contributing Author

Betting on the river

St. Louis invests heavily along the Mississippi

On Feb. 9, 2014, the Stan Musial Veterans Memorial Bridge officially opened to traffic in the St. Louis area.

The long-anticipated, \$700 million New Mississippi River Bridge (MRB) project will move I-70 off the congested Poplar Street Bridge. This is the first of several projects that will have the biggest impact to the interstate network in the St. Louis riverfront area in more than 50 years.

"The people in St. Louis really don't have any idea what's going to happen here very soon. By October 2015, traffic patterns are going to change drastically. We're actually

going to relieve all of the traffic congestion downtown. And it's also going to create economic opportunities. This is the beginning of a big change for the city. It's pretty exciting," said Greg Horn, district engineer for the Missouri Department of Transportation (MoDOT) St. Louis District.

Two other ongoing major projects will follow on the heels of the MRB project: the expansion and reconstruction of the Poplar Street Bridge (PSB) and interchange and the Park Over the Highway (POH) project. These projects came out of a MoDOT study conducted in the early 1990s to improve traffic flow and safety on the interstate system (I-55, I-44, I-64 and I-70) in the downtown St. Louis area.

The improvements that have either been



Right: MoDOT helped to jump-start another major infrastructure project in the downtown area in front of the Gateway Arch. CAR 2015 wants to revitalize the Arch grounds and the city by making it more accessible and friendly to visitors and local citizens.

completed or are currently under way provide remarkable case studies in technical achievement. Added to this is the way a culture of flexibility, collaboration and innovation, fueled by a transformed department of transportation, fostered an environment of exceptional achievements among its design teams, contractors and stakeholders.

Preferably face to face

From the outset of the MRB project, collaboration was a priority. "The first thing we did after signing the MRB agreement was to set up a consolidated project office. So we made all of the consultants assigned to the various phases of the project work out of a centralized location. We probably had 50 designers working out of that office," said Randy Hitt, project director for the MRB.

Replacing e-mail and phone queries with quick jaunts down the hall for a face-to-face discussion proved highly productive, considering the tight schedule that MoDOT self-imposed on the project.

"One of the things I learned years and

years ago is that getting a job done quickly usually saves you money," Horn said.

Bringing the design team together at a single physical location paid immeasurable dividends, but it wouldn't have been as successful had MoDOT not broken down some barriers of bureaucracy that can slow projects to a crawl. The Missouri Highway Commission granted MoDOT managers the power to make decisions without working their way up the traditional chain of command. The consultants working in the office also were asked to implement similar decision-making authority within their own organizations.

"During the selection process, we were asked if our project lead would have authority to make decisions," said Dan Meckes, president of Crawford, Murphy & Tilly (CMT), the lead design firm for the MRB/I-70 Interchange. "Our ability to meet that requirement really helped to keep the project moving along at the pace that it needed to be."

CMT's previous experience with MoDOT included serving as project manager for the POH project and subconsulting on the PSB

team. Out of that same consolidated office, CMT also had a design team leading the quarter-mile MRB Illinois approach bridge.

"We really appreciate MoDOT's collaborative approach to projects. Tight schedules, among other things, can often be challenging, but in the end you know that as a team you have accomplished some amazing things," said Meckes.

In addition to saving time on the MRB project, the consolidation of teams also saved money, as described in the following sections.

Time to be creative

MoDOT challenges its design consultants to find creative ways to deliver projects for less cost. MoDOT also leads the industry in the implementation of value engineering (VE) and practical design (PD), methods that reduce project costs without sacrificing quality or safety.

"From our director and chief engineer on down, we're always pushing innovation and being bold. That permeates through the whole organization, the willingness to try new

things and be flexible, because we do have a limited budget like everyone else. We think that the practical design methodology gives a better chance for success," said Hitt.

The success of practical design was dramatized by the MRB/I-70 Interchange project. On that project CMT developed and facilitated a streamlined VE/PD process that required only a one-day workshop at the beginning of the project. The key was to apply the PD and VE principles early in the design to achieve the maximum savings possible. In this case it was based on MoDOT's preliminary design concept.

The PD team consisted of CMT designers, MoDOT design and construction staff, Federal Highway Administration (FHWA) personnel and an outside contractor. The team's workshop produced 80 creative solutions, 14 of which were eventually implemented into the final plan. One of the most notable solutions was the lowering and reversal of the flyover ramps that connect the new bridge to I-70 and I-44. This change improved constructability and saved money by reducing the bridge heights. Another cost reducer was the



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separation of a Y-shaped bridge into separate structures, which also improved safety.

After the PD changes were implemented, the savings for the project exceeded \$13.6 million, or 28% of the programmed amount. Moreover, having a consolidated office assured that ongoing innovation and savings continued to be applied throughout the remainder of the design.

"The savings were phenomenal. A lot of things had to happen in a very confined area. At the end of the day, these solutions worked out great for all of the parties involved," Hitt said.

The money saved on the interchange project allowed the MRB project to progress as savings were redirected to the main bridge

span, where costs were running higher than anticipated due to increasing steel costs.

CAR and park

In keeping with its philosophy of collaboration and creativity, MoDOT helped to jump-start another major infrastructure project in the downtown area in front of the Gateway Arch. CityArchRiver 2015 (CAR 2015) is a civic organization whose mission is to celebrate the 50th anniversary of the opening of the Gateway Arch. It includes the CityArchRiver 2015 Foundation, National Park Service, MoDOT, Great Rivers Greenway District, city of St. Louis, Metro (Bi-State Development Agency), Metro East Park and Recreation District and Gateway Center of

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Two other ongoing major projects will follow on the heels of the MRB project: the expansion and reconstruction of the Poplar Street Bridge and interchange and the Park Over the Highway project.

Metropolitan St. Louis. CAR 2015 wants to revitalize the Arch grounds and the city by making it more accessible and friendly to visitors and local citizens. With major interstate and street elements involved, MoDOT stepped up as the lead agency to jump-start the most integral element of that program, referred to as the POH. Central to the project is a 280-ft land bridge over the interstate that provides pedestrian

connection between the Arch and the Old Courthouse via Luther Ely Smith Square.

While MoDOT originally intended to limit its involvement to the review process of this multiagency project, internal discussions led it to assume a leadership role. Because the overall project had been slow to gain momentum, agency staff wanted to use its experience and drive to expedite the project, which would maximize opportunities for additional federal funding.

Moving forward, the I-70 corridor (soon to be redesignated as I-44) will be further transformed as part of the POH with a variety of on-off-ramp-related modifications. CMT oversaw the land bridge project, which includes numerous street improvements and bridge reconstruction tasks within an eight-block area of downtown St. Louis. MoDOT selected CMT to lead the engineering portion of the POH, in part because the two groups had partnered on the nearby I-70 interchange. Once the design team was in place, it was full-steam ahead.

“One of the first things we did when we sat down to talk scope was to say, ‘We need to bump the schedule up about three months.’ We like working with firms where we can do things like that and they don’t blow a gasket,” said Jim Middleton, MoDOT project manager.

As lead consultant, CMT used the same consolidated office concept for its own internal team of subconsultants that had proven so successful on the MRB project. The schedule challenge was compounded by the number of stakeholders and decision makers involved in the project.

“This was basically a highway project being designed within the context of a very high-profile urban place-making initiative,” Meckes



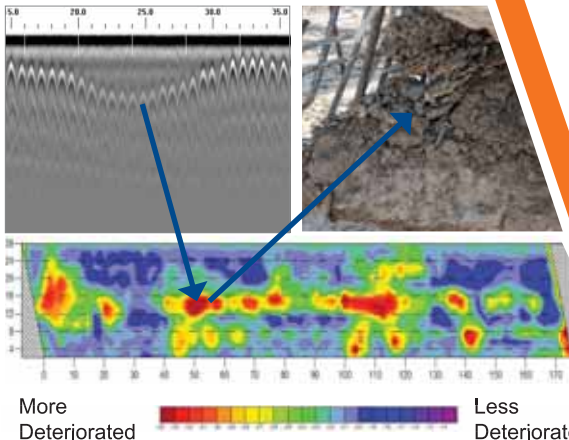
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emphasized. "Our drive to move things forward had to take into consideration the creative process of the architects, which isn't typical of a transportation project, but we ended up building a very productive relationship."

Having regularly scheduled biweekly collaboration meetings with the architect and a host of other stakeholders facilitated the design and decision-making process and kept work on schedule. The key challenge on this project was minimizing disruption to the traveling public and adjacent landowners.

The highlight of the process was a constructability workshop, the first of its kind, developed using VE methodology and facilitated by CMT in concert with MoDOT. A team consisting of designers, an outside contractor and key stakeholders considered alternatives that would streamline construction while maintaining function and costs. Thirty-three of the ideas generated during the workshop were approved by MoDOT and incorporated into design and construction documents. These improvements shortened the construction schedule by three to four months, first by reducing the number of construction stages and, second, by constructing some of the stages concurrently rather than consecutively. It was estimated that the shortened schedule would result in savings between \$0.8 million and \$1.1 million.

Closing the gap

Before POH construction is completed, MoDOT will be orchestrating the construction related to the \$80 million PSB and interchange reconstruction.

The removal of the I-70 ramps (via MRB) has made room for dual ramps for I-55 access, which will greatly enhance safety and relieve congestion. The construction of the I-55 ramps, along with ramps for I-44 and I-64, will require ramp and lane closures. The bridge itself will be closed for one weekend while the eastbound structure is shifted 9 ft so the bridge can be widened. Later it will be closed for several months for resurfacing.

"This will require a total reconstruction of the interchange, impacting access to three interstate highways. But with well-thought-out staging and an active public-awareness campaign, we'll be able to keep traffic moving," said Jeff Bohler, project director for the Poplar Street project.

The PSB project will greatly reduce traffic congestion in the region and has been badly needed for decades.

"I'm not sure we would be talking about this project had we not changed the way we do business that has resulted in the MRB and POH projects that make this one finally possible," said Horn. "Our philosophy is this: The consultants know how to design a project and the contractors know how to build a project—our job as the transportation agency is to remove the roadblocks that can delay the project and raise the cost."

MoDOT has discovered, through this achievement in the nation's Gateway to the West, that a culture that rewards creativity, flexibility and collaboration can go a long way toward doing more with less. **R&B**

Law is a highway and bridges manager in CMT's St. Louis office.

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