

Design-Build Icon

The kcICON project will deliver a signature bridge and renewed transportation corridor, thanks to a new design-build procurement model.



For more than half a century, the Paseo Bridge over the Missouri River has linked Kansas City, Mo.'s downtown with the city's northland, carrying more than 100,000 vehicles each day. Even before the structure, which is the longest self-anchored suspension bridge in North America, suffered a structural failure that forced its closure for emergency repairs in 2003, the Missouri Department of Transportation had conducted a major investment

study that confirmed the bridge's structural obsolescence, as well as the need for a new structure that could accommodate the city's traffic growth.

Considering either a major overhaul or a replacement, MoDOT hired HNTB to conduct an environmental impact study

that began in April 2004, "in case future funding came along," said MoDOT project director Brian Kidwell. Even at this early stage, MoDOT knew it wanted considerable project flexibility, a fact that required HNTB to craft the EIS looking at how the project might affect the environment and people without restricting options for proposers if the project were to become a reality.

"That was asking HNTB to do the environmental impact statement in a way they'd never done before," Kidwell said.

Just seven months after the EIS began, Missouri voters approved Amendment 3, which provided MoDOT with funding for several

major bond-financed projects. A statewide priority-setting process unfolded quickly, designating the Paseo Bridge as the highest-ranking unfunded project and allocating \$195 million for its replacement.

The existing Paseo Bridge, which was designed by HNTB in the 1950s, is a Kansas City landmark, and therefore the community wanted to replace it with another signature span, an implausible option with the original funding amount alone. Soon after, a supplemental \$50 million legislative earmark, secured with the help of Missouri Senator Christopher Bond, allowed the project to move forward with improvements to the I-35/I-29 corridor, plus the construction of a signature span.

At the same time, MoDOT also had received authority for three pilot design-build projects, a process that had never been used in Missouri. HNTB had been hired as the general engineering consultant for the first of those projects, the reconstruction of Interstate 64 near St. Louis. The Paseo Bridge replacement — dubbed kcICON — for which HNTB was selected to provide program management assistance, would be MoDOT's second design-build effort.

MAXIMIZING INNOVATION

"We wanted to create a new model for design-build," Kidwell said. "Instead of telling proposers what we wanted them to build and then asking how cheaply and quickly they could build it, we wanted a non-prescriptive, fixed-price, best-value approach."

With a design-build vision in mind, MoDOT looked to outside consultants to help implement a new, innovative approach for project delivery. That team, which was led by David Downs, the current program management professional services leader for HNTB, helped develop the design-build procurement process in place today.

"In my experience working around the country developing design-build models, Missouri had a vision for one of the most innovative



HNTB worked closely with MoDOT officials to identify potential risks for the project and allocate risk to all stakeholders before the bidding process began.



The existing Paseo Bridge is one of several crossings over the Missouri River in Kansas City, Mo., and serves as a gateway to the city's downtown loop. The new bridge and corridor improvements will increase mobility throughout the city.

“Opening our standards got competing teams to cherry-pick the best value design options from around the country and bring them all into one project.”

BRIAN KIDWELL
PROJECT DIRECTOR
MoDOT

approaches, which maximized how they define success with a design-build project,” said Downs. “Our team helped them realize that vision, and worked closely with MoDOT and HNTB to deliver value on every step of the process.”

MoDOT’s approach to design-build was immediately put to the test.

“The funding was in place and there were hurry-up desires from leadership and the community,” Kidwell said. “We worked with HNTB to get the project off the ground because they were so familiar with the pieces and parts of this corridor, and already were so active in the EIS process. We wrote a broad, all-encompassing, on-call contract to tap into HNTB’s expertise for anything we might need on the project. It was hard to project what we’d get into, since we hadn’t done it before, but HNTB’s size, experts and desire to partner with MoDOT on this new model made it a great fit.”

Using the EIS and values from a community advisory group that represented both sides of the river, and without defining what the

completed bridge would entail, goals were set to guide the design-build process:

- Widen the Interstate 29/35 corridor leading into downtown, delivering these improvements within the total program budget of \$245 million.
- Construct a landmark Missouri River bridge that can be reasonably maintained to provide more than a century of useful service.
- Maximize safety, mobility, aesthetic and capacity improvements in the corridor.
- Engage stakeholders and the community to successfully develop and deliver the project.
- Meet or beat the project completion date of October 31, 2011.

“MoDOT’s approach had never been done before, anywhere,” said HNTB Project Manager Rachel Lunceford. “MoDOT had nowhere near the dollars needed to build the desired project, but asked the industry to be as creative as possible.”

Procurement Process for Design-Build Innovation

Design-build continues to gain traction as a preferred method for delivering transportation projects that have high stakeholder appeal but limited budgets. For the Missouri Department of Transportation, a new design-build procurement process—unique because of the freedom it gave proposers to draw from project-specific best practices from around the nation—allowed the agency to deliver a high-profile bridge for much less than would have been possible through traditional procurement methods. MoDOT will use this new process, which is outlined below, for appropriate projects in the future.

1 Identify Project or Program

Identified funding and legislative impacts of decisions made.

2 Set Project or Program Goals

To help develop budget, schedule and scope goals for kclCON, MoDOT and the design-build team began the goal-setting process, analyzing how potential goals would affect the project outcome.

3 Prioritize Goals

A workshop was held to place the kclCON goals in priority order, and to discuss the impact of these placements along the way.

6 Complete Pre-Procurement Planning

- **RFP development**
Experts in geotechnical, roadway, bridges, aviation, hydraulics and hydrology, environmental, urban design and architecture provided expertise into the RFP development.
- **Subsurface utility investigations**
HNTB and its subconsultant identified area utilities and managed the as-built information.
- **Field survey**
HNTB and its subconsultant conducted field surveys.
- **Preliminary cost estimating**
From impact analysis of decisions made to alternatives analysis on trade-off discussions, HNTB provided information to facilitate decisions and ensure a timely and efficient process.
- **Right-of-way identification and facilitation**
HNTB and its subconsultants supported right-of-way acquisition activities, including identifying right-of-way needs, developing plats and surveying.
- **Third-party agreements**
Close collaboration with agencies including the Corps of Engineers, the Coast Guard, the Federal Aviation Administration, railroads and municipalities helped achieve timely turnaround of permits and agreements associated with the project.
- **Procurement process**
Issuing a request for qualifications and developing a short list of responders immediately preceded issuance of the draft request for proposals and the industry review.

5 Allocate/Mitigate Risk

Risk allocation discussions were held to determine which risk elements would be transferred to the contractor, which the owner would keep and which would be shared. Analysis was provided on how those allocations would impact owner contingency versus how they would impact contractor bids to determine the appropriate course of action. Elements the owner would keep were mitigated prior to procurement.

4 Identify Risk

For kclCON, HNTB's knowledge of local conditions and how those conditions could impact the design-build project helped identify risk elements, which included permits, third-party agreements, geotechnical conditions and environmental issues.

7 Implement the Procurement Process

- **Final RFP issued**
- **Technical proposal discussions take place**
HNTB added value by participating in request for information reviews, reviewing alternative technical proposals, responding to the industry and providing feedback from subject-matter experts.
- **Final proposals submitted**
- **Contractor selected and contract awarded**

8 Manage the Program Post-Award

After the design-build contractor was under contract, HNTB provided subject matter expertise in design reviews, contract management, third-party coordination, public involvement and construction management to ensure that MoDOT received a quality project, on time and on budget.



Most design-build projects follow a far more prescriptive process. “For the kcICON project, we had concepts and the right-of-way corridor, but didn’t require a specific design,” Kidwell said. “We also opened up our design standards, allowing contractors to use any standard already accepted by the Federal Highway Administration. Opening our standards got competing teams to cherry-pick the best value design options from around country and bring them all into one project. The fixed price made this work. We found a way to get every high-priority item into the job within one fixed price, which allowed us to come up with a project that has the highest value for the people paying for it. We modified all kinds of our own typical procedures to get a project that really reflected citizens’ goals.”

“MoDOT has its own design manual and its own specs, but they threw all that out,” Lunceford said. “The approach turned previous processes on their heads — it was that different — and we got beautiful aesthetics and all of the things we wanted for much less than the anticipated cost.”

PRECISE EXPERTISE MEETS CHALLENGES

Among the project challenges was creating as much room as possible for innovation without eliminating standards that still were necessary to conform to the EIS.

“The new bridge is being built over one of the world’s fastest flowing rivers, adjacent to five railroads and is 1.5 miles from Kansas City’s downtown airport,” Lunceford said. “That limits a certain amount of creativity — you can’t eliminate coordination with these agencies, for example put a pier in the middle of a railroad. HNTB reviewed the standards that the contractors would bring in from other parts of the country and evaluated how those standards would be applied to the project.”

HNTB also assisted in prioritizing project goals, developing the request for proposals, developing a scoring system for proposal

review that awarded higher technical points for greater creativity and participating in the contractor selection process.

“HNTB brought wide-ranging expertise to the process,” Kidwell said. “This job had about every pitfall possible — the river’s geotechnical issues, different cities, right-of-way, aviation and traffic issues, utilities, interstate design features, noise issues. For everything we ran into, somebody at HNTB was exactly qualified to meet our needs, instantaneously. They provided an army of support.”

MODEL FOR THE LONG TERM

MoDOT is sold on the best-value approach of its new design-build method.

“The model will work well going forward,” Kidwell said. “The whole nation is suffering from construction budget reductions, and everybody must do what they can with the money available. Because every project is different, bright people have to come up with best-value solutions. Contractors bring varying expertise and designers have encountered other solutions. When agencies look to them to offer up all these experiences, we really stretch our dollars.

“As an industry of engineers, we like following convention, getting really good at the process of knowing how to do something. We can easily deliver that type of job. But what MoDOT found is that by involving more people and leaving more options for the design-build team, really good ideas and huge benefits will emerge.” ■

CONTACT:

JERRY MUGG, HNTB Kansas City Office Leader
(816) 472-1201 ■ jmugg@hntb.com

