

AASHTO Innovation Initiative

[Proposed] Nomination of Innovation Ready for Implementation

Sponsor

Nominations must be submitted by an AASHTO member DOT willing to help promote the innovation. If selected, the sponsoring DOT will be asked to promote the innovation to other states by participating on a Lead States Team supported by the AASHTO Innovation Initiative.

1. Sponsoring DOT (State): Missouri

2. Name and Title: Ed Hassinger, Deputy Director/Chief Engineer

Organization: Missouri Department of Transportation.

Street Address: 105 W. Capitol Avenue

City: Jefferson City

State: MO

Zip Code: 65102

Email: Ed.Hassinger@modot.mo.gov

Phone: 573-751-3692

Fax: na

Innovation Description (10 points)

The term “innovation” may include processes, products, techniques, procedures, and practices.

3. Name of the innovation:

Using Design-Build for Small Bridge Bundles

4. Please describe the innovation.

This innovation is the first use of design-build for a regional small (20 – 25 million dollar) Design Build bridge bundle in Missouri. Historically, MoDOT has utilized design-build for major bridges, such as Champ Clark, Buck O'Neil, Rocheport and bridge corridor bundles such as I-44 Design Build Project in MoDOT's Southwest District.

Instead of using design-build in the traditional manner, the Southeast District expanded its use for the [Bootheel Bridge Bundle](#)—a bundle of small bridge projects across Southeast Missouri.

The technique of hiring a single contracting team to complete the design work and construct the improvement in one contract has been known to significantly save time and provide cost savings. Now, MoDOT's Southeast District has shown this project delivery method brings the same benefits to bridge bundling projects. The Bootheel Bridge Bundle design-build project exemplifies process improvement and increased efficiency.

The success of this project has demonstrated the benefit of expanding the use of the design-build project delivery method.

5. What is the existing baseline practice that the innovation intends to replace/improve?

The Bootheel Bridge Bundle design-build project, which was a bundle of 15 primary and 10 alternate bridges across Southeast Missouri, improved the existing design-build process by expanding its use and working to increase competition among contractors. Bridge bundling has been delivered in prior projects through standard bid-build. This innovation expands the baseline practice of bid-build by utilizing industry expertise to provide bridge bundles that exceed expectations in quantity and quality of construction. The specific improvement, above baseline bid-build practice, that this innovation provided is seen by the inclusion of two additional alternative bridges included in the proposal. Alternative bridges were provided during the procurement phase as optional structures the proposers could include in their proposal for additional value. The two additional bridges that the proposer provided were included at no additional cost to taxpayers and without reducing quality at any location.

Historically, MoDOT has utilized design-build for major bridges, such as Champ Clark, Buck O'Neil and Rocheport, as well as major roadway expansion projects. The Bootheel Bridge Bundle design-build project extended the use of this alternative project delivery method and proved it could produce the same benefits for bundling projects. Bundling these projects into a single design-build contract produced more than a \$1 million cost savings.

6. What problems associated with the baseline practice does the innovation propose to solve?

The baseline practice of using bid-build to deliver bridge bundles limits industry innovation by not partnering with them until it is too late to maximize their innovative potential. This reduces the ability to improve on issues related to the design, construction, and project management of bridge bundles. Using design-build allows for designers and bridge builders to partner early in the life of a project with state project personnel and determine the best course of action for each structure.

An additional baseline problem this innovation solves is the issue of only using design-build to deliver singular, major projects was not utilizing this project delivery method to its full capacity. Restricting the use of design-build was an issue with past projects. Ultimately, if each of the Bootheel Bridge Bundle locations were let and awarded through separate contracts, it would have been more costly. Through this process, MoDOT saved over \$1 million and two bridge projects were added to the contract through the potential add-on list.

7. Briefly describe the history of its development.

Design-build was chosen as the best method to deliver the Bootheel Bridge Bundle. Competing contractors were presented a list of 15 primary bridges to be completed through the project, as well as a list of potential add-on bridges. The 10 potential add-ons were an innovative way for contractor teams to potentially add values to their proposals—increasing the value of the project, while staying within the budget.

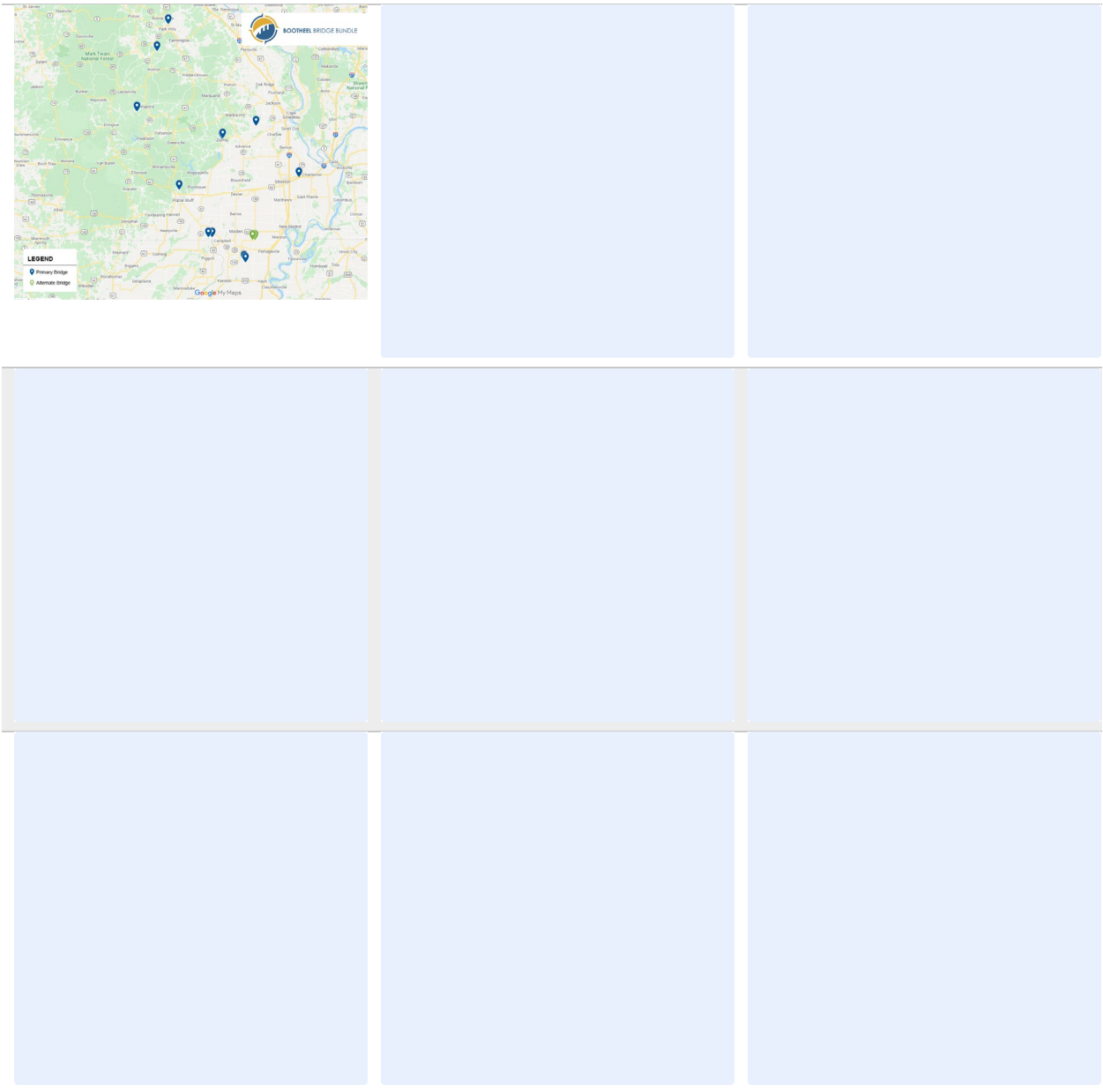
During one-on-one meetings with contractors, each team looked at the 15 required bridges and considered adding as many bridges as possible to expand the scope of the project. During the review of the proposals, cost saving measures and alternate treatment methods were reviewed to get the most value for the required 15 bridges. Value added to the proposals through the selection of alternates was also considered. The design-build contractor selected for the Bootheel Bridge Bundle selected two additional bridges from the alternates list—totaling 17 bridges improved through the Bootheel Bridge Bundle.

8. What resources—such as technical specifications, training materials, and user guides—have you developed to assist with the deployment effort? If appropriate, please attach or provide weblinks to reports, videos, photographs, diagrams, or other images illustrating the appearance or functionality of the innovation (if electronic, please provide a separate file). Please list your attachments or weblinks here.

During the bidding process, the Bootheel Bridge Bundle team modified the DB-903a form that was used on the I-44 Design Build Project in MoDOT's Southwest District to fit a small bridge bundling design-build

project. This resource helped save time and money by streamlining the process by which potential contractors developed their bridge package. It simplifies work by reducing questions and concerns over filling out the form and how the form translates to the potential contractors' score. A short presentation about the DB-903a form is available at <https://youtu.be/bo38fqYA1s0>.

Attach photographs, diagrams, or other images here. If images are of larger resolution size, please provide as separate files.



State of Development (40 points)

Innovations must be successfully deployed in at least one State DOT. The All selection process will favor innovations that have advanced beyond the research stage, at least to the pilot deployment stage, and preferably into routine use.

9. How ready is this innovation for implementation in an operational environment? Please select from the following options. Please describe.

- ☐ Prototype is fully functional and yet to be piloted
- ☐ Prototype has been piloted successfully in an operational environment
- ☒ Technology has been deployed multiple times in an operational environment
- ☐ Technology is ready for full-scale implementation

Construction of the Bootheel Bridge Bundle is currently underway. The first bridge completed through the design-build project reopened to traffic 10 days ahead of schedule, and work is continuing as planned. Within the project goals, it states the project will be delivered on or before Dec. 31, 2023. However, the selected contractor tentatively plans to complete the project by September 2023.

Now, MoDOT has two additional bridge bundling design-build projects underway—the FARM (Fixing Access to Rural Missouri) Bridge Program and the I-44 Corridor Bridge Bundle Project. A contractor was selected for the FARM Bridge Program in May 2021, and an industry meeting was held for the I-44 Corridor Bridge Bundle Project in June 2021.

10. What additional development is necessary to enable implementation of the innovation for routine use?

No additional development is necessary to implement the innovation.

11. Are other organizations using, currently developing, or have they shown interest in this innovation or of similar technology? ☐ Yes ☒ No

If so, please list organization names and contacts. Please identify the source of this information.

Organization	Name	Phone	Email
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Potential Payoff (30 points)

Payoff is defined as the combination of broad applicability and significant benefit or advantage over baseline practice.

12. How does the innovation meet customer or stakeholder needs in your State DOT or other organizations that have used it?

By bundling bridges into a single design-build project, MoDOT is saving time and being a good steward of taxpayers' dollars. This method coordinates design and construction expertise, encourages innovation and flexibility, and drives competition to deliver faster results and save taxpayers' dollars.

13. Identify the top three benefit types your DOT has realized from using this innovation. Describe the type and scale of benefits of using this innovation over baseline practice. Provide additional information, if available, using quantitative metrics, to describe the benefits.

Benefit Types	Please describe:
Cost Savings	Bundling the bridges into a single design-build contract produced a cost savings of more than \$1 million.
Shorter Schedule	Hiring one contracting team to complete the design work and build improvements under one contract has resulted in smoother coordination and scheduling of construction and a time savings.
Other (please describe)	Using this alternative project delivery method and offering potential contractors the opportunity to select add-ons to increase the value of their proposal helped drive competition and allowed for greater innovation.

Provide any additional description, if necessary:

Click or tap here to enter text.

14. How broadly might this innovation be deployed for other applications. in the transportation industry (including other disciplines of a DOT, other transportation modes, and private industry)?

According to the American Road & Transportation Builders Association, “There are 171.5 million daily crossings on over 45,000 structurally deficient U.S. Bridges in poor condition.” This innovation could be used across the country as a method to deliver small cost-effective bridge bundles. This process and the DB-903a form is being shared throughout MoDOT and other districts have already adopted this innovative idea. This innovation could also be easily implemented within other DOTs with an active design-build program.

Market Readiness (20 points)

The All selection process will favor innovations that can be adopted with a reasonable amount of effort and cost, commensurate with the payoff potential.

15. What specific actions would another organization need to take along each of the following dimensions to adopt this innovation?

Check boxes that apply	Dimensions	Please describe:
<input checked="" type="checkbox"/>	Gaining executive leadership support	Approval of Design - Build
<input type="checkbox"/>	Communicating benefits	Click or tap here to enter text.
<input type="checkbox"/>	Overcoming funding constraints	Click or tap here to enter text.
<input checked="" type="checkbox"/>	Acquiring in-house capabilities	Internally, the DOT or district would need a design-build team to execute the project according to standards and regulations.
<input type="checkbox"/>	Addressing legal issues (if applicable) (e.g., liability and intellectual property)	Click or tap here to enter text.
<input checked="" type="checkbox"/>	Resolving conflicts with existing national/state regulations and standards	Legislative support for Design – Build Project Delivery
<input type="checkbox"/>	Other challenges	Click or tap here to enter text.

16. Please provide details of cost, effort, and length of time expended to deploy the innovation in your organization.

Cost: No additional costs were needed to develop this Design-Build Bridge Bundle

Level of Effort: The Design – Build project took a higher degree of effort by fewer employees. This process is ideally managed by a small but high level team.

Time: 30 labor hours were needed to develop the innovation.

17. To what extent might implementation of this innovation require the involvement of third parties, including vendors, contractors, and consultants? If so, please describe. List the type of expertise required for implementation.

Executing the design-build contract would require a contractor team.