BIL, Bridge Bundling & SDCL Construction

World Bridge Engineering Conference

Miami, FL

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University of Wyoming
Short Span Steel Bridge Alliance

Special Thanks To:
MoDOT: Bryan Hartnagel & Jeff Gander
Wilson & Co Engineering: Jason Kemnitz & Garrett Hummel
Lehman Construction: Ryan Porter & Kenny Lehman
Delongs: Gary Wisch

Short Span Steel Bridge Alliance – Who We Are

*A group of **bridge** and **buried soil structure** industry leaders who have joined together to provide **educational information** on the design and construction of short span steel bridges.*

www.ShortSpanSteelBridges.org

Rolled Beam & Plate Girder

Buried Bridges

Truss

Press Brake Tub

Bridge Infrastructure Law

- FHWA: Bridge Infrastructure Law – Bridge Investment Program (BIP)
- www.fhwa.dot.gov/bipartisan-infrastructure-law/bip_factsheet.cfm

Fiscal year (FY)	2022	2023	2024	2025	2026
Contract authority	$600M	$640M	$650M	$675M	$700M
Advance appropriation (General Fund)	$1.847B	$1.847B	$1.847B	$1.847B	$1.847B
Total BIL funding (FY22-26)	**$2.447B**	**$2.487B**	**$2.497B**	**$2.522B**	**$2.547B**
Subject to future appropriation	$600M	$640M	$650M	$675M	$700M

$40 million per year for Tribal bridges

$20 million per year for Planning grants

Up to 5% for culverts

15% for off-system bridges

Bridge Infrastructure Law

- Types of Awards:
  - *Large Bridge Projects (>$100 mil) – minimum grant $50 mil*
  - *Other Bridge Projects (<$100 mil) – minimum grant $2.5 mil*
  - *Planning Grants – no minimum*

- Maximum Amount of Grant
  - *50% for Large Bridge Projects*
  - *80% for Other Bridge Projects*
  - *90% for Off-System Bridges*

Bridge Bundling - bridge bundling is specifically identified in 23 U.S.C. 124(a)(1)(B)(i) as an eligible project, and such projects are **encouraged** under the BIP. Bundling of multiple bridges into a single project is a method to meet the project threshold requirements for a BIP grant and often results in total project cost savings.

Bridge Bundling

- FHWA Bridge Bundling Guidebook: *An Efficient and Effective Method for Maintaining and Improving Bridge Assets*
- www.fhwa.dot.gov/ipd/pdfs/alternative_project_delivery/bridge_bundling_guidebook_070219.pdf
- A **bridge bundling program targets a defined set (or bundle) of bridges** that are planned for preservation/preventive maintenance, rehabilitation, or replacement in a timely and efficient manner through a series of bridge bundling contracts with the support of various funding options and/or partnerships and may include a program completion time frame.
- This practice **includes joint State and local efforts** that have resulted in cost savings and expedited project delivery. Bridge bundling has proved to be a valuable tool in all three of the major approaches to managing bridges: preservation/preventive maintenance, rehabilitation, and replacement

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Ten major steps to implementing a successful bridge bundling project.

Define successful bridge bundling (Chapter 1)

Determine goals & objectives (Chapter 2)

Identify funding or financing (Chapter 3)

Build a coalition & outreach (Chapter 4)

Perform risk assessment (Chapter 5)

Select bridges (Chapter 6)

Select delivery method (Chapter 7)

Determine environmental review & preliminary design considerations (Chapter 8)

Bundle & let contract(s) (Chapter 9)

Conduct quality assurance, close-out & celebrate! (Chapter 10)

Missouri DOT Design Build Experience

- 22 Design Build Contracts Awarded (as of 1/1/2023)
  - Smallest $14.4M (I-70 Climbing Lanes 2020)
  - Largest $487M (Safe and Sound Bridge Program 2010)
- $2.53 billion awarded, $821 million under contract (as of 1/1/2023)

Missouri DOT Bridge Bundling Projects

Safe and Sound Project

554 Bridges Design Build, $487 million

Bootheel Bridge Bundle Project

17 Bridges, $25.5 million

I-44 Corridor Bridge Bundle

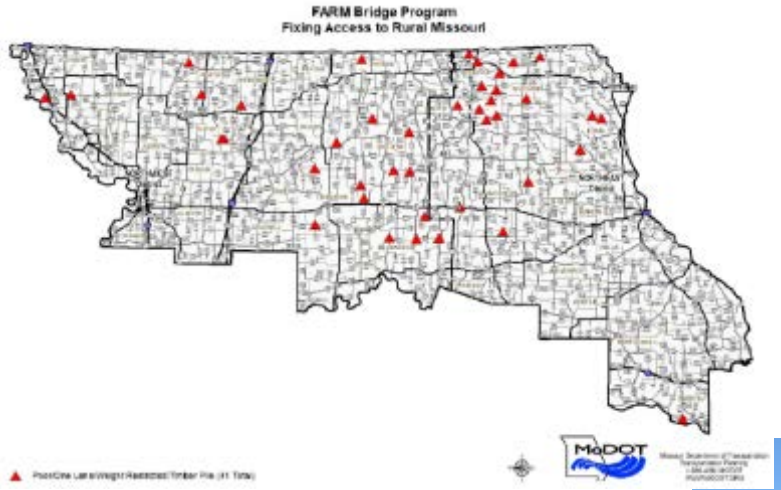
25 Bridges, $43.2 million

Fixing Access to Rural Missouri (FARM) Bridge Program

31 Bridges, $26 million

FARM Design-Build Bridge Bundling Project

- Fixing Access to Rural Missouri (FARM)
- MoDOT identified 40 rural bridges in northern Missouri Districts
  - Poor condition
  - Weight-restricted
  - One-lane but carry 2-way traffic
  - On timber piles
  - Located in 17 counties
  - Length range from 28 ft to 198 ft
  - ADT range from 36 to 1200
  - Constructed between 1927 and 1955



- Project Requirements
  - All construction will consist of structure replacement

FARM Design-Build Bridge Bundling Project

Project Goals

Best Value for a **Fixed Budget**

- Safely deliver the project on or before October 31, 2023
- Use innovation to maximize the number of locations to be addressed
- Provide quality long-lasting structures
- Minimize public inconvenience through construction speed and flexibility in scheduling

Project Budget

- Total Program Budget of $26 million
  - Project awarded $20.8 grant through Competitive Highway Bridge Program
  - Matching funds of $5.2 million from NE and NW Districts
- Design-Build Contract of $21.5 million

FARM Design-Build Bridge Bundling Project

Missouri's Design-Build Law: Statute 227.107

Request for Qualifications and Statement of Qualification scoring requirements

- Submitter Experience (100 points)
  - Relevant Recent Experience
  - Quality and Safety
  - DBE and Workforce
- Key Personnel (100 points)
  - Project Manager
  - Quality Manager
  - Design Manager
  - Construction Manager

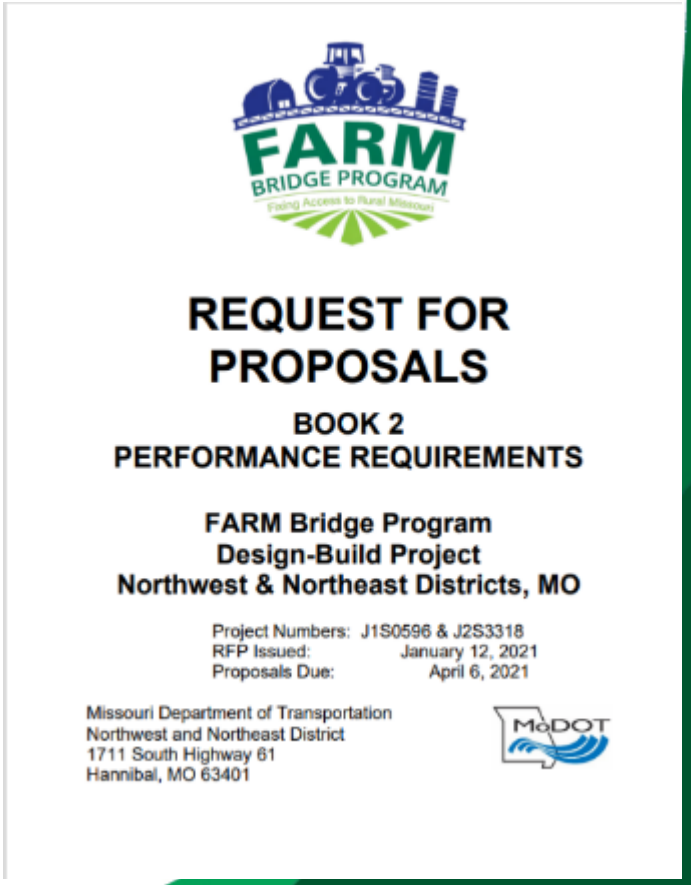
- State statute dictates shortlist between 2 and 5 teams
- Shortlisted 5 teams – 3 submitted qualified proposals

FARM Design-Build Bridge Bundling Project

Missouri's Design-Build Law: Statute 227.107

Request for Proposals procedures

- The RFP release consisted of 5 books and the Instructions to Proposers
  - Book 1 – Contract Language
  - **Book 2 – Specific requirements of the FARM Bridge Program**
  - Book 3 – Applicable Standards
  - Book 4 – Information that MoDOT stands behind
  - Book 5 – For information only
  - ITP – Instructions to Proposers


REQUEST FOR PROPOSALS

BOOK 2
PERFORMANCE REQUIREMENTS

FARM Bridge Program
Design-Build Project
Northwest & Northeast Districts, MO

Project Numbers: J1S0596 & J2S3318
RFP Issued: January 12, 2021
Proposals Due: April 6, 2021

Missouri Department of Transportation
Northwest and Northeast District
1711 South Highway 61
Hannibal, MO 63401

Pay reasonable stipend for non-selected proposals

$130,000 provided for qualified proposal not selected

FARM Design-Build Bridge Bundling Project

Missouri's Design-Build Law: Statute 227.107

Best Value for a **Fixed Budget**

Proposal scoring guidance

Bridge Bundle (55 pts total, Part 1 40 pts and bonus Part 2 15 pts)
Quality & Longevity (30 PTS)
Completion & Maintenance of Traffic (15 PTS) **TOTAL = 100 pts**

Category	Available Points
Bridge Bundle	55
Bridge Quality and Longevity	30
Location Completion and Maintenance of Traffic	15
Total	100

Category	Available Points
Bridge Bundle	
Part 1 – DB-903a Bridge Definition Summary	40
Part 2 – Bonus Points	15
Total	55

Bridge Bundle Definition was scored from data entered into the DB-903a form

Bridge Quality and Longevity was scored by a team of 8 technical experts.

Completion and Maintenance of Traffic was scored by a team of 6 technical experts

FARM Design-Build Bridge Bundling Project

Best Value for a Fixed Budget

Quantitative

- Bridge Bundling Part 1 (40 pts)
  - Number of Bridges
  - Minimum 30
  - DB-903a Form Considers:
    - Size Factor
    - Condition Ratings
    - ADT
- Bridge Bundling Part 2 (15 pts)
  - Bonus for Bridges over 30
  - 1.5 per Bridge

Qualitative

- Quality & Longevity (30 pts)
  - Anticipated Maintenance
  - Bridge Type & Foundation
  - Bearing & Deck Type
  - Bridge Ends and Expansion
  - Retaining Wall Systems
- Completion & Maintenance of Traffic (15 pts)
  - Days of Construction
  - Road Closures & Reduced Lanes
  - Construction Staging & Traffic
  - Work Zone & Public Impacts

FARM Design-Build Bridge Bundling Project

Bids & Award

Best Value for a Fixed Budget

Category	Available Points	Team 1 Primarily Concrete	Team 2 Primarily Concrete	Team 3 Primarily Steel
Bridge Bundling Part 1	40	39.7	38.3	40
Bridge Bundling Part 2 (Bonus)	15	1.5	0	1.5
Quality & Longevity	30	18.7	20	21.7
Completion & Maintenance of Trafiic	15	5.8	11.8	8.9
TOTAL SCORE	100	65.7	70.1	72.1

Primarily Steel Bridges Won the Bid

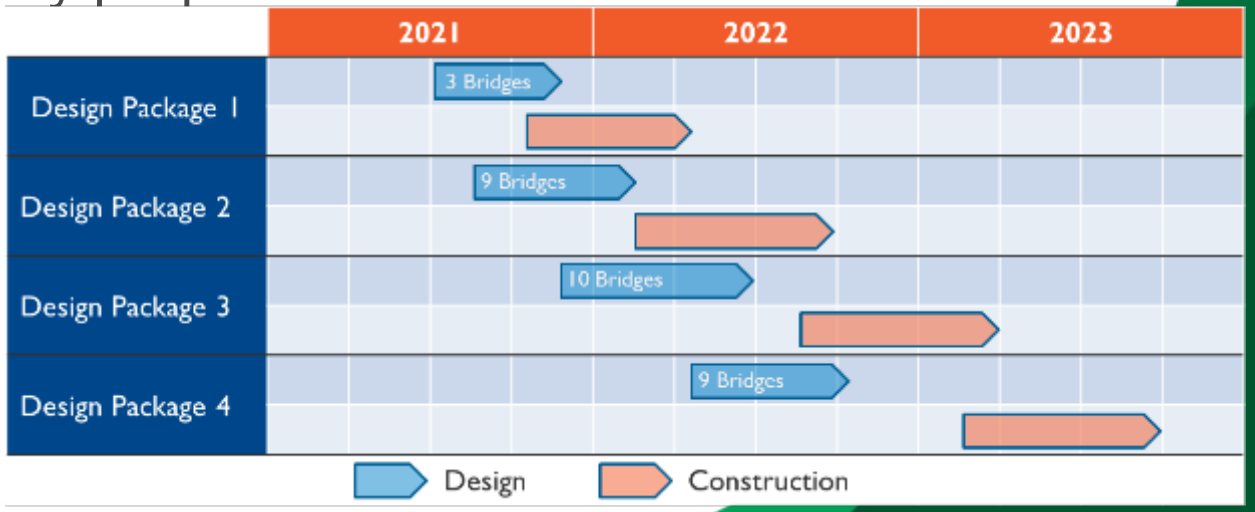
FARM Design-Build Bridge Bundling Project

- Best Value Proposal
- Lehman Construction & Wilson Engineers
  - 31 structures replaced (1 bonus bridge)
  - Low maintenance steel structures that allow for future re-deck and rehabilitation
  - Added value of $760,000 over other Proposals (Based on MoDOT's initial estimates)
  - Additional 2321 SQFT of existing bridge deck replaced compared to others
  - Highest average ADT for routes included of any proposal
  - Highest average Benefit Cost Ratio of any proposal

Four Design Packages

3 R/C Box Culverts
3 Simple Span NU Girders
25 Multi-Span Steel Bridges

Schedule

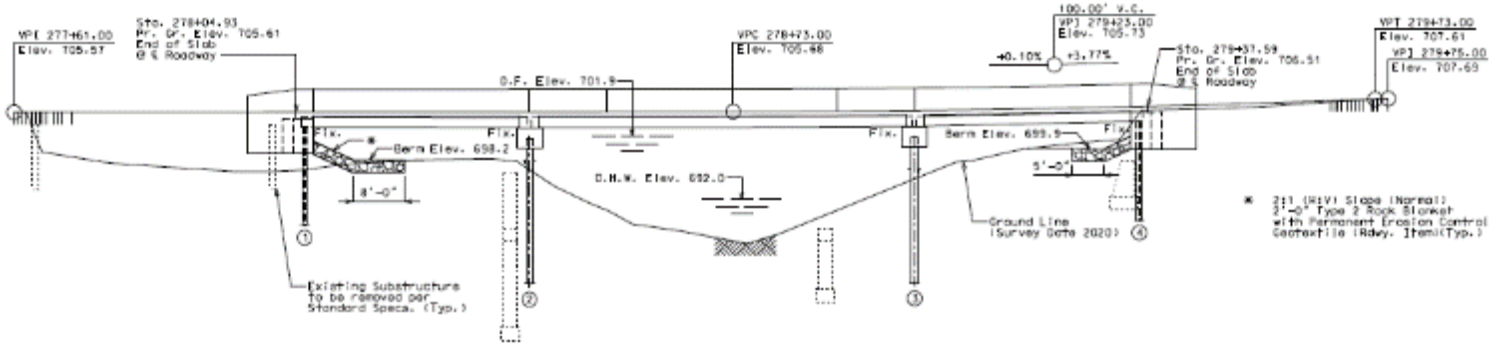


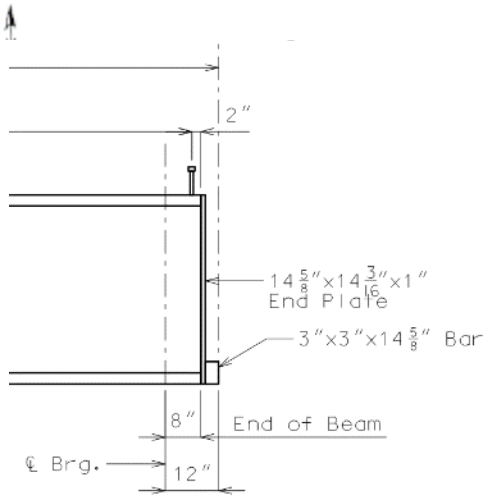
FARM Design-Build Bridge Bundling Project

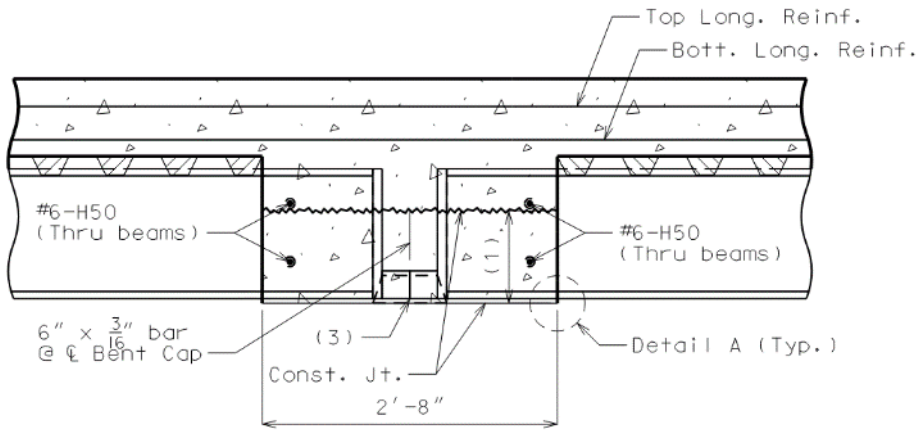
- How Did Steel Win the Bid? – for the 25 multi-span bridges
  - Bridge Bundling (40 pts + 1.5 pts bonus) highest score — Economy of Steel Bridges
    - 31 bridges replaced
    - Innovative Simple for Dead Load, Continuous for Live Load (SDCL) designs
  - Quality & Longevity (21.7 pts) highest score — Performance of Steel Bridges
    - Galvanized beams – 100 yr expectation in rural setting
    - Full-depth CIP deck
  - Completion & Maintenance of Traffic (8.9 pts) 2nd highest — Equipment & Ease of Construction
    - Ease and pace of construction
    - Weight of bridge and lighter equipment

Simple for Dead, Continuous for Live (SDCL)

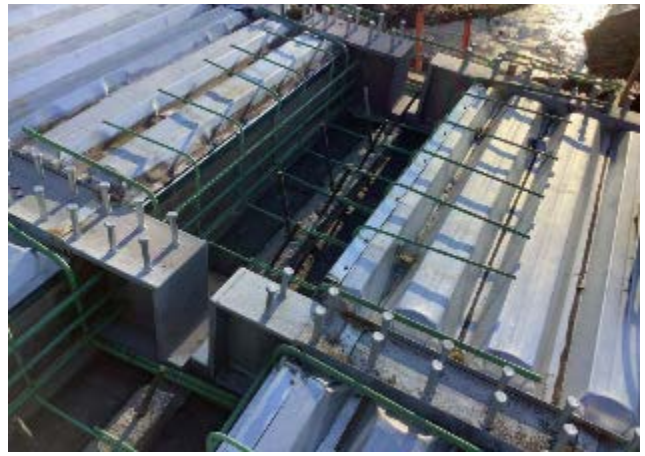
- Multi-span bridges using simple span wide flange beams, with simple details, made continuous when the deck is cast







Simple for Dead, Continuous for Life (SDCL)



Advantages for SDCL

- Ease of construction
- Eliminates the use of traditional field splices
- Flexible & economical span ratios
- Customize beams to the spans
- Simple details make steel fabrication much more competitive
  - Certified Bridge Fabricator – Simple Bridge (SBR)
  - ~~Certified Bridge Fabricator – Intermediate Bridge (IBR)~~
  - ~~Certified Bridge Fabricator – Advanced Bridge (ABR)~~
- Beam Weights
  - Steel W18x158 @ 60’ = 9480 lbs. Concrete MoDOT P/S Type 3 @ 60’ = 23,869 lbs.
- Shallower depth superstructure (Approach Work Savings, Hydraulics Opening)
  - Steel W18x158 @ 60’ Depth = 19.7” Concrete MoDOT Type 3 @ 60’ Depth = 39”

Hear from Designer, Owner, Fabricator & Contractor

Link to Video

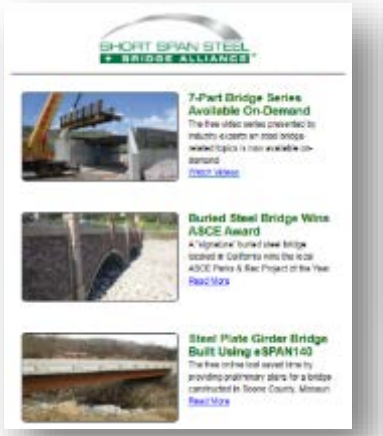
https://www.wevideo.com/view/3200060682

Link to SSSBA Website Information on SDCL Bridge Construction

https://www.shortspansteelbridges.org/modot-sdcl-design/

5 Ways to Keep Learning About Steel Bridges

1. Subscribe to the Weekly Newsletter



2. Find a Supplier

3. Design a Bridge in 5-Minutes

eSPAN140™

4. Receive Free Project Assistance

5. Schedule a Workshop/Webinar

www.ShortSpanSteelBridges.org

Questions? Dan Snyder, Director, SSSBA, dsnyder@steel.org, (301) 367-6179

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