Steel Bridges for Local Communities

Minnesota Local Technical Assistance Program
January 15, 2025

Dr. Michael G. Barker, PE
University of Wyoming &
SSSBA, Director of Education

www.shortspansteelbridges.org

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 in installations up to **140 feet in length**.*

David Stoddard, SSAB, Chair SSSBA

Short Span Steel Bridge Alliance – Why We Are

Remove Design Obstacles for Short Span Steel Bridges

- eSPAN140 Standard Designs, Design Software

Overcome Preconception that Concrete is Always Less Expensive in Short Span

- Initial and Life Cycle Cost Studies

Prefabricated Steel Bridge Systems and Accelerated Bridge Construction

- Case Studies and Alliance Members

Develop and Implement Innovative Steel Bridge Systems

- Press-Brake Tub Girder Bridges & SDCL Construction

Educate Owners, Engineers & Students in Steel Bridge Design

- Webinars, Presentations, Workshops and On-Line Certificate Programs

SSSBA Education – The 5 Cs

Cost

- Case Studies
- Cost Studies
- Life Cycle Costs
- Economical & Practical Design

Convenience

- eSPAN140
- Standard Designs
- State Standards
- Design Software

Construction

- Accelerated Bridge Construction
- Simple for Dead, Continuous for Live
- Case Studies / Manufacturer Solutions
- Equipment

County Built

- DIY County Bridges
- Case Studies

Carbon – CO_2e

- Sustainability of Rural Bridges

Resiliency Coming Soon

Today's Session

Initial Costs – *Dealing with the Preconception on Steel Bridge Costs*

Life Cycle Cost Comparison Steel vs Concrete – *Long Term Performance & Costs*

eSPAN140 Design Tool – *Steel Bridge Design Made Easy*

Bridge Manufacturer Solutions/ABC – *I Need a Bridge, Bring Me One*

DIY: local Crews Building County Bridges – *Workforce Development & Costs*

Simple for Dead, Continuous for Live Steel Bridge Construction – *Innovative Design*

Workshops, Resources & Opportunities Through the Short Span Steel Bridge Alliance

We Only Have Time to Quickly Address These Today:
More Information and Reports at ShortSpanSteelBridges.org

Initial Costs: Steel & Concrete

Preconception that Concrete is Less Expensive than Steel for Typical Bridges

Many Times Steel is Not Even Considered

Owners Paying More Than They Could for Bridges

Unwarranted Lack of Competition Not Good

Initial Costs

SSSBA Conducted Case Studies:

- County & State Bridges
- Bids & Actual Costs
- Case Studies of County Bridges
- **Others Not Shown Here**

Superstructure	Steel						Concrete				
Bridge Number	061	140	149	152	710	AVG	028	057	069	520	AVG
Year Built	2008	2008	2008	2009	2010	AVG	2009	2010	2011	2006	AVG
Span Length	50	50	40	62	64	53.2	36	36	38	40	37.5
Skew	0	0	0	30	35	13	0	15	20	30	16.25
Cost Summary											
- Labor	$14,568	$21,705	$15,853	$24,765	$31,949	$21,768	$12,065	$15,379	$14,674	$19,044	$15,291
- Material	$56,676	$53,593	$46,282	$92,821	$69,357	$63,746	$51,589	$54,450	$50,576	$46,850	$50,866
- Rock	$6,170	$6,216	$3,694	$8,235	$6,501	$6,163	$5,135	$7,549	$5,378	$3,621	$5,421
- Equipment	$7,487	$12,026	$7,017	$19,579	$15,266	$12,275	$5,568	$10,952	$11,093	$14,742	$10,589
- Guardrail	$4,715	$7,146	$3,961	$7,003	$7,003	$5,966	$4,737	$4,663	$5,356	$3,323	$4,520
Construction Cost	$89,616	$100,686	$76,807	$152,403	$130,076	$109,918	$79,094	$92,993	$87,077	$87,580	$86,686
CONST. COST PER FT²	**$74.68**	**$83.91**	**$80.01**	**$102.42**	**$84.68**	**$86.09**	**$91.54**	**$107.63**	**$95.48**	**$91.23**	**$96.32**

Case Study Bridges: Audrain County, MO

Steel: Superstructure $37.54 per sq. ft.

Concrete: Superstructure Cost $50.61 per sq. ft.

25.8% superstructure cost savings

Same bridge conditions:

- Structural Depth = 2 ft. (No Difference in Approaches)
- Roadway Width = 24 ft.
- Same Abutments for Both Can be Used (Steel Could Use Lighter)
- Same Guard Rail System
- Same Work Crew

State Bridge (Designed by eSPAN140)

Kansas Department of Transportation

- Shawnee County
- 112 feet (5 plate girder bridge)
- Competitive bid process (steel vs. concrete)
- DOT used eSPAN140 for preliminary design
- Constructed in summer 2014

1 Steel Bridge Bid

3 Concrete Bridge Bids

Kansas Department of Transportation

Steel = $ 1.240 mil

Concrete = $ 1.243 – $ 1.425 mil

County Bridge (Designed by eSPAN140)

- **Boone County, Missouri (Local)**
  - High Point Lane Bridge
  - 102 feet (2 lane rural road plate girder bridge)
  - 44" weathering steel plate girders (4 lines)
  - Constructed in summer 2013

Two MoDOT Bridges Crossing US 63 in Boone County

Concrete P/S: 92 ft – 92 ft

Route H (Columbia Airport)

Letting Date 5/27/2011

1800	206-10.00	Class 1 Excavation	85	CUYD	$1,700.00
1810	702-10.12	Structural Steel Piles (12 in.)	737	LF	$33,533.50
1820	702-60.00	Pre-Bore for Piling	240	LF	$9,600.00
1830	702-70.00	Pile Point Reinforcement	22	EA	$2,420.00
1940	725-10.00	Corrugated Metal Pipe Pile Spacers	10	EA	$20,000.00

Total Bridge Cost = $440,632.50

Cost/ft² = $77.71

Steel Plate Girder: 98 ft – 98 ft

Discovery Parkway (Columbia)

Letting Date 9/28/2007

1560	206100	Class 1 Excavation	130	CUYD	$4,420.00
1580	7021012	Structural Steel Piles (12 in.)	1850	LF	$64,750.00
1570	6071066	Pedestrian Fence	470	LF	$33,840.00
1590	7027000	Pile Point Reinforcement	60	EA	$5,700.00
1730	7251000	Corrugated Metal Pipe Pile Spacers	20	EA	$5,000.00
1670	7125365A	Intermediate Field Coat (System G)	22100	SQFT	$30,940.00
1680	7125370A	Finish Field Coat (System G)	2800	SQFT	$3,220.00
1690	7129911	Misc. Fab. Struc. Low Alloy Steel (Aesthethics	24330	LB	$54,742.50

Total Bridge Cost = $1,0[illegible]

Cost/ft² = $64.04

Cost/ft² with ENR CCI Adjustment of 1.1[illegible] = $72.94

Using ENR CCI Index Increase of 2.7%/yr

For 2017 Concrete = $ 91.18/ft²

Steel = $ 85.58/ft²

Steel Bridges Compete and Win!

Studies at:
ShortSpanSteelBridges.org

What About Life Cycle Costs?

As owners replace their bridge infrastructure, the question of Life Service and Life Cycle Costs routinely comes up between concrete and steel bridge options

The bridge industry ~~does~~ did not have a good answer:

Both steel and concrete bridge advocates claim an advantage

Anecdotal information is not convincing

Historical Life Cycle Costs of Steel & Concrete Girder Bridges

Examine Historical Life Service (Performance and Maintenance) and Agency Life Cycle Costs (True Agency Costs for a Bridge) of Steel and Concrete Bridges in Pennsylvania

Example Bridge Life Cycle

OMB Circular A-94 2011 30 yr Discount Rate = 2.3%

Present Value Cost for 1 Cycle

$$PVC = \$143.45 + \$16.63(1.023)^{-19} + \$0.28(1.023)^{-40} + \$0.34(1.023)^{-44} = \$154.49/ft^2$$

Perpetual Present Value Cost = Capitalized Cost

$$PPVC = \$154.49\left[\frac{(1+0.023)^{70}}{(1+0.023)^{70}-1}\right] = 1.256(\$154.49) = \$193.97/ft^2$$

With Capitalized Costs, Can Compare Bridges Directly

Large Database of Steel & Concrete Bridges

Thank You to PennDOT professionals for their participation

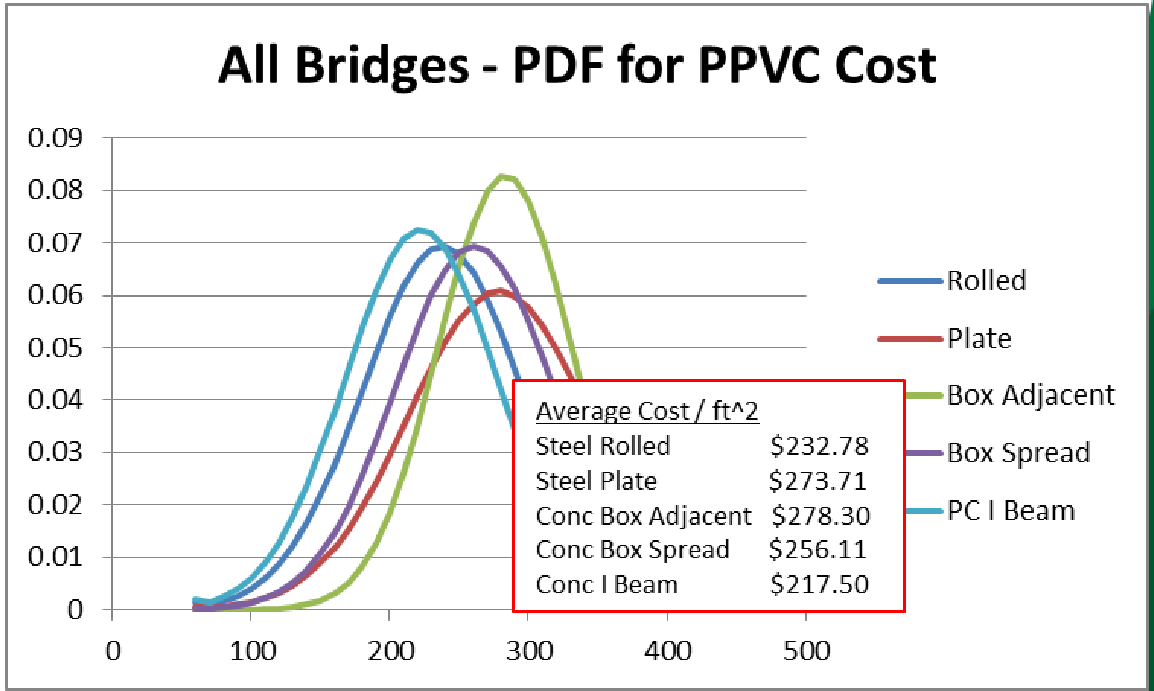
Support from AISI, NSBA and AGA

Conclusions

Typical Concrete and Steel Bridges are Competitive on Initial Cost, Future Costs, Life Cycle Costs and Bridge Life

Owners Should Consider Both Steel and Concrete Alternatives for Individual Bridge Projects

All are "similar" with None "Way Out" of Balance



Report on ShortSpanSteelBridges.org

Additional Report on LCC Galvanizing

Common Simple Span Steel Bridge Types

Corrugated Steel Pipe
(Buried Steel Bridge)

Corrugated Steel Plate
(Buried Steel Bridge)

Rolled Beam Shape

Plate Girder

Truss

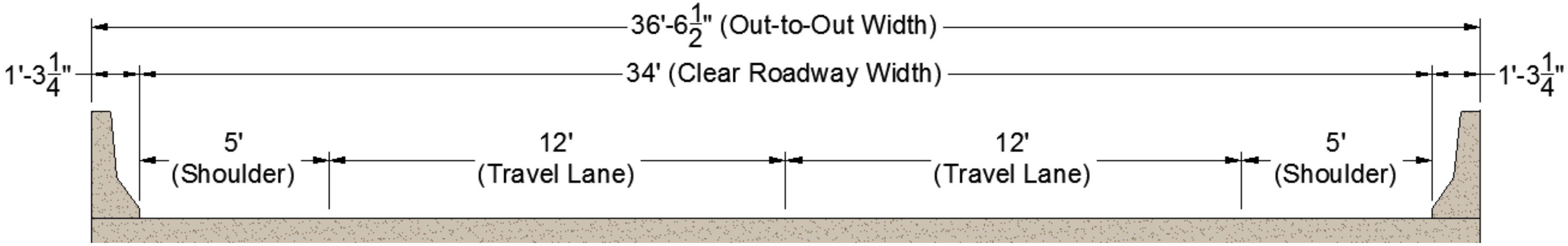
Press-Brake Tub Girder

Traditional Fabricated Steel Bridges

Design Superstructure for Two-Lane, 80 ft Simple Span Bridge

Bridge Need and Basic Information

- Decided by Owner/Engineer:
  - 80 ft Simple Span Composite – Steel Girders
  - Two 12 ft Travel Lanes, ADT = 5600 one direction
  - 34 ft Roadway Width
  - Jersey Barriers (1 ft – 3 ¼ in wide)



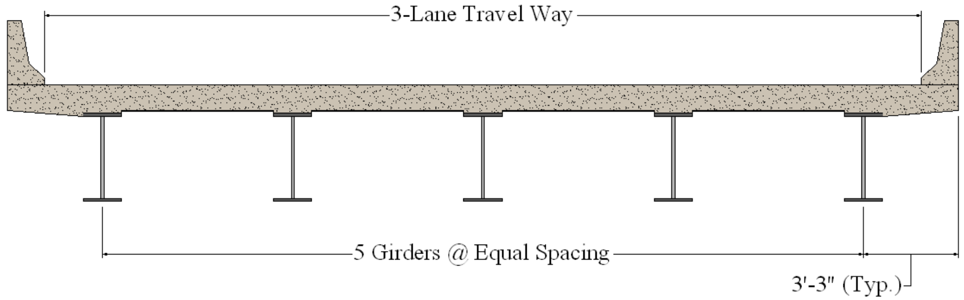
Need an Initial Design for the Bridge SuperStructure

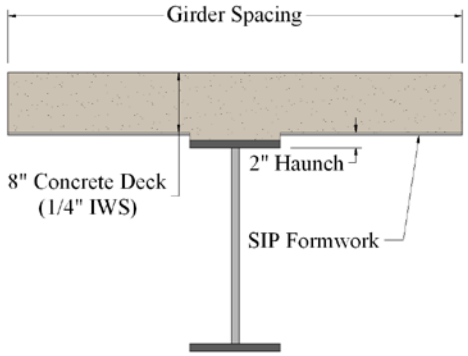
eSPAN140 - Standard Designs for Short Span Steel Bridges - www.ShortSpanSteelBridges.org

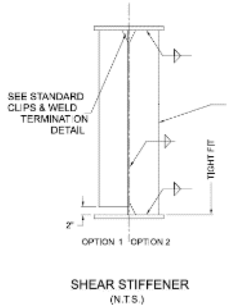
Span lengths 20 ft to 140 ft (in 5 ft increments)

Four girder spacing: 6’-0”, 7’-6”, 9’-0” and 10’-6”,

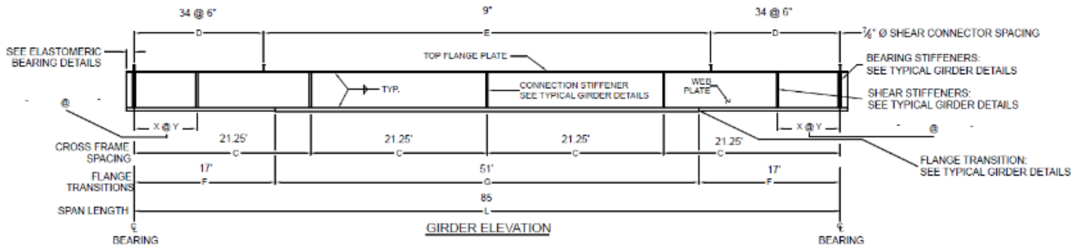
For each of these increments: Steel girders, Shear stud & stiffener layouts, Welding and fabrication details, Elastomeric bearings, and Concrete deck design

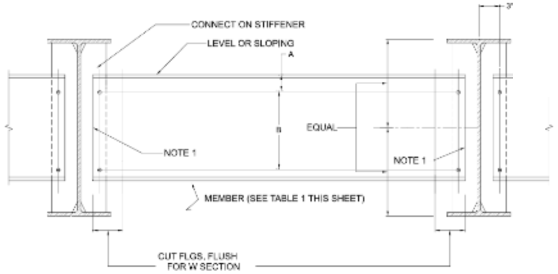






COMPOSITE PLATE GIRDER WITH PARTIALLY STIFFENED WEB - 4 GIRDERS AT 8' 10" GIRDER SPACING, HOMOGENEOUS





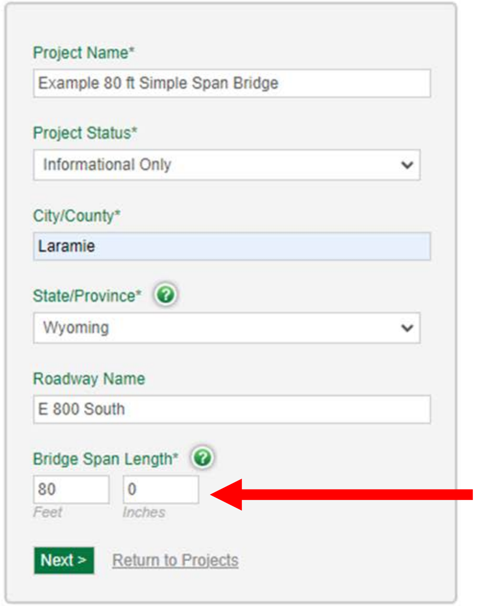
eSPAN140 Preliminary Design

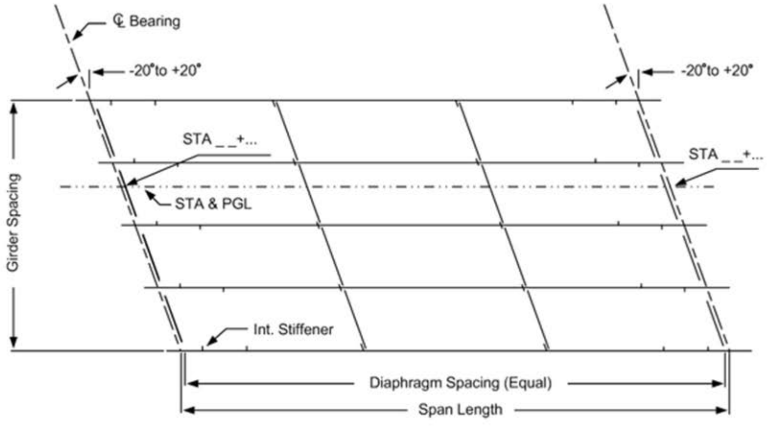
Solution Type*	Bridge Span Length: 0'	20'	40'	60'	80'	100'	120'	140'	Skew Angle	Overhang Width
Rolled Beam (40' to 100')**									+/- 20 degrees	3'3" or less
Homogeneous Plate Girder (60' to 140')**									+/- 20 degrees	3'3" or less
Press Brake Tub Girders (0' to 80')									+/- 20 degrees	3'3" or less
Buried Bridges (all)***									+/- 35 degrees****	N/A

* For bridges outside of this range, standard designs will not appear in your solutions book.
** Standard designs for rolled beam and plate girder solutions are rounded in five (5) foot increments.
*** Depending on project requirements this solution will require multiple spans.
**** Can be greater if site geometry allows.

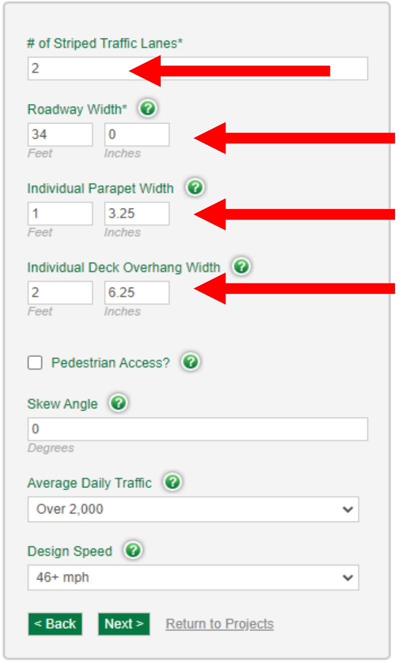
**** Can be greater if site geometry allows.

eSPAN140 Preliminary Design

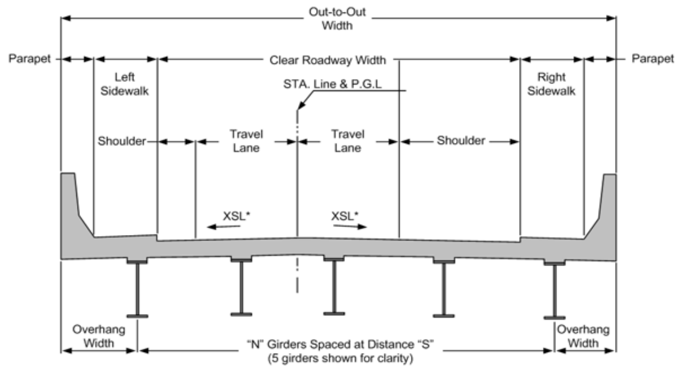

Project Name*
Example 80 ft Simple Span Bridge
Project Status*
Informational Only
City/County*
Laramie
State/Province*
Wyoming
Roadway Name
E 800 South
Bridge Span Length*
80 | 0
Feet | Inches
Next > | Return to Projects



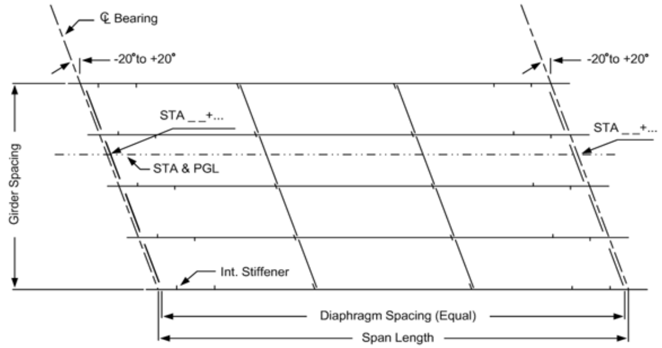
Skew Angle (Overhead View)


# of Striped Traffic Lanes*
2
Roadway Width*
34 | 0
Feet | Inches
Individual Parapet Width
1 | 3.25
Feet | Inches
Individual Deck Overhang Width
2 | 6.25
Feet | Inches
Pedestrian Access?
Skew Angle
0
Degrees
Average Daily Traffic
Over 2,000
Design Speed
46+ mph
< Back | Next > | Return to Projects

* Required



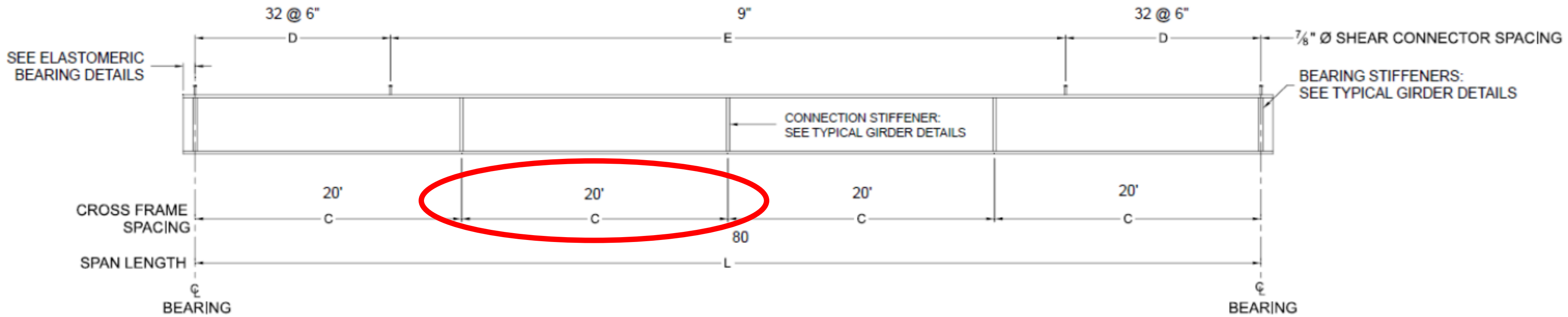
Cross-section of Bridge


℄ Bearing
-20°to +20°
-20°to +20°
STA _ _+...
STA _ _+...
STA & PGL
Girder Spacing
Int. Stiffener
Diaphragm Spacing (Equal)
Span Length

Rolled Beam Recommendation

COMPOSITE ROLLED BEAM WITH PARTIALLY STIFFENED WEB - 4 GIRDERS AT 10' 6" GIRDER SPACING, LIGHTEST WEIGHT

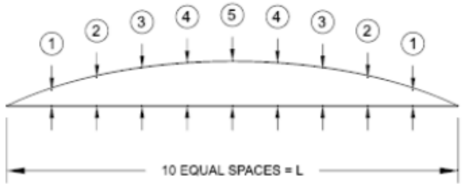
The selected rolled beam section is based on the widest (10'-6") girder spacing used in the development of the standards. The steel industry generally recommends the use of the widest girder spacing possible to reduce the potential number of girder lines for optimum economy.



BEAM ELEVATION

SPAN (L) - ft	ROLLED BEAM	DIAPHRAGM SPACING (C) - ft	SHEAR CONNECTOR MAX. SPACING		WEIGHT
			D	E	
80	W36x210	20'	32 @ 6"	9"	16,800 lbs

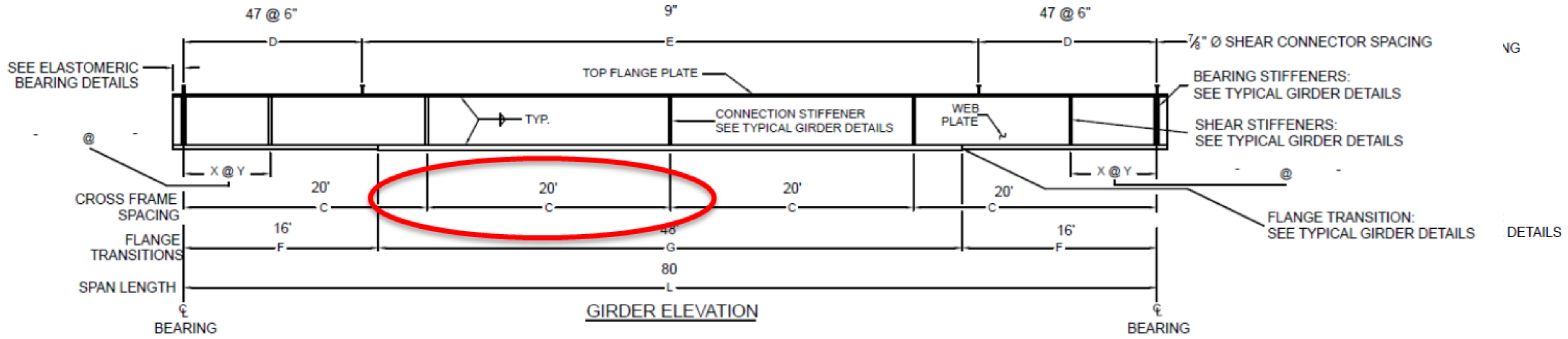
STEEL D.L. CAMBER - in					TOTAL D.L. CAMBER - in				
1	2	3	4	5	1	2	3	4	5
0.178"	0.337"	0.461"	0.540"	0.567"	1.255"	2.375"	3.250"	3.807"	3.997"



D.L. CAMBER

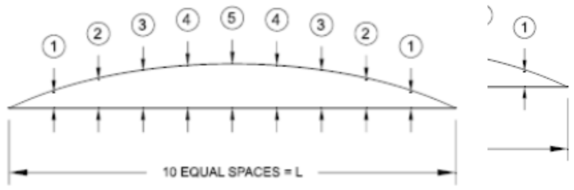
Plate Girder Recommendation

COMPOSITE PLATE GIRDER WITH PARTIALLY STIFFENED WEB - 4 GIRDERS AT 10' 6" GIRDER SPACING, HOMOGENEOUS



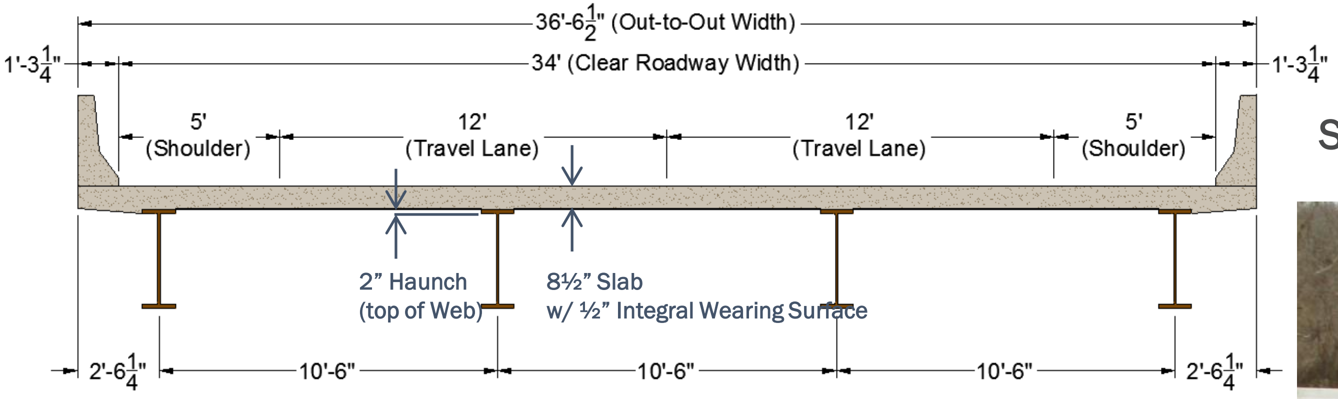
SPAN (L) - ft	PLATE GIRDER SIZE						DIAPHRAGM SPACING (C) - ft	SHEAR STIFFENERS		SHEAR CONNECTOR MAX. SPACING		INDIVIDUAL GIRDER WEIGHT
	TOP FLANGE - in	BOTTOM FLANGE (F)		BOTTOM FLANGE (G)		WEB PLATE- in						
		PLATE - in	LENGTH - Ft	PLATE - in	LENGTH - Ft			X (NO. REQ'd)	Y - ft. (SPACING)	D	E	
80	16 x 1"	16 x 1"	16'	16 x 1 1/2"	48'	32 x 1/2"	20'	-	-	47 @ 6"	9"	14,373 lbs

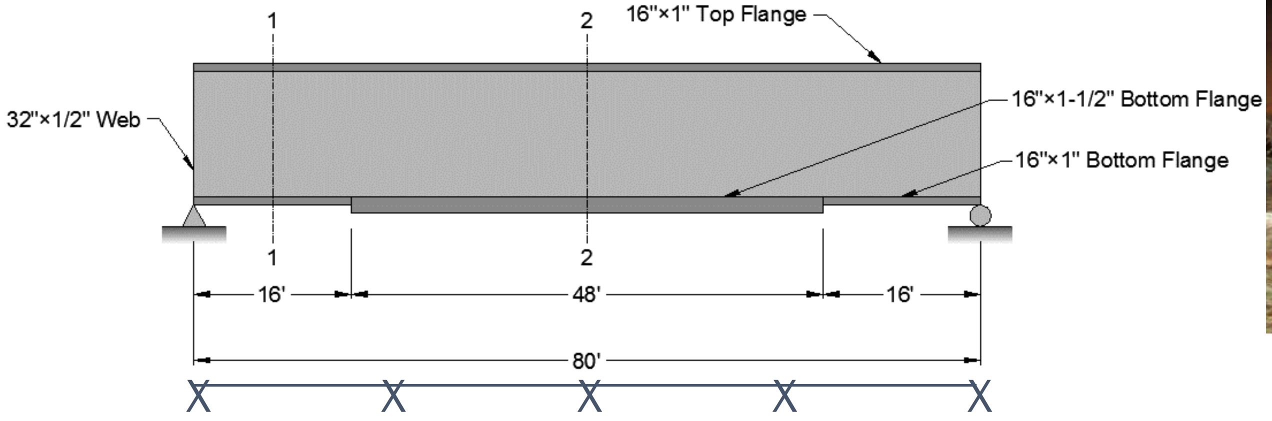
STEEL D.L. CAMBER - in					TOTAL D.L. CAMBER - in				
1	2	3	4	5	1	2	3	4	5
0.178"	0.334"	0.454"	0.530"	0.557"	1.397"	2.618"	3.554"	4.149"	4.355"



D.L. CAMBER

Design for Homogeneous Plate Girder Bridge





Diaphragm Bracing at 20 ft

Superstructure Design for Two-Lane, 80 ft Simple Span Bridge

Manufacturer Solutions

Prefabricated & ABC Steel Bridges

Showcase of 3 Different Steel Bridges

Bridge Case Studies

- Buried Steel Bridge – Big R
- Modular Beam Bridge - Contech
- Press-Brake Tub Girder – Valmont

The 5 C's

Cost

Convenience

Construction (ABC)

County Built

Carbon Footprint

Prefabricated Bridges

Accelerated Bridge Construction

County Built

Buried Steel Bridge - Corrugated Steel Plate – Contractor Built

VT Route 2B Bridge Replacement, St. Johnsbury, VT

Contractor: JP Sicard

Fabricator: Big R Bridge

28 day max. trail closure / 50 day road closure for all work

Greeley, CO

47’11” span x 26’9” rise Arch

Buried Steel Bridge - Corrugated Steel Plate

Buried Steel Bridge - Corrugated Steel Plate

VT Route 2B Bridge Replacement, St. Johnsbury, VT

Deep Corrugated Steel Buried Bridges

Craig, AK
Built by Tribal Workforce

Pre-Fabricated Modular Beam – County Crew Built

Seltice-Warner Bridge, White Road, Whitman County, WA

Fabricator: BigR/Contech Engineered Solutions
Contractor: Whitman County Crew
Design Engineer: Mark Storey, County Engineer

CONTECH ENGINEERED SOLUTIONS

Existing Structure – 30 ft Span, 20 ft Wide

- Wood with Wood Piles & Wood Backwalls
- Wood Deterioration & Susceptibility to Scour

Replacement Structure Requirements

- Increase Hydraulic opening – 30 ft Channel
- Raise Clearance for 100 yr Flood
- Gravel Roadway
- Piles with Alluvium Soils / Scouring

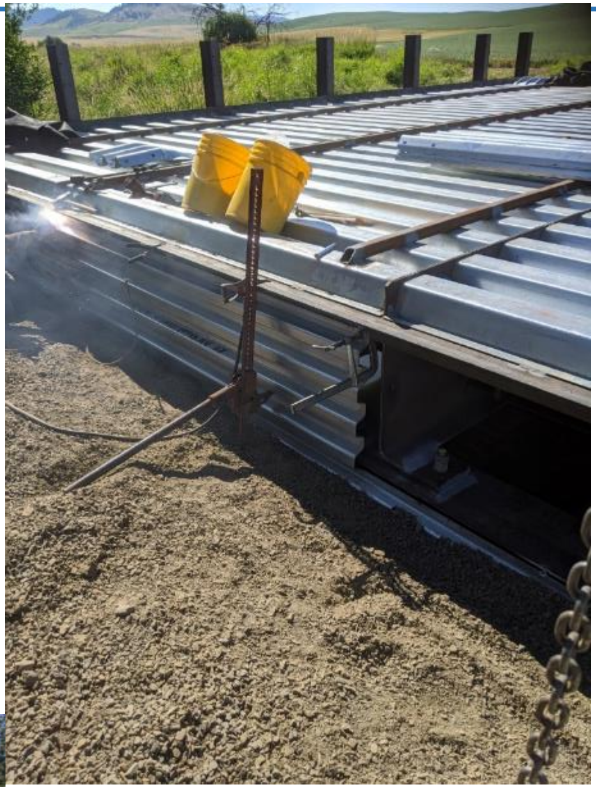
Pre-Fabricated Modular Beam

Bridge Structure

- 35 ft Span x 28 ft Wide
- 2-Girder Modules / 3 Modules
- Shipped on One Truck
- Fully-Assembled
- CSD & Gravel
- Simple Connections

Pre-Fabricated Modular Beam

SuperStructure Erection



Pre-Fabricated Modular Beam

Timing

Excavation, Stream Restoration & Bridge Installation ~ 4 Weeks

Costs

Steel Superstructure	$ **59,000**
Labor & Equipment	$ 70,000
Pile Foundations	$ 20,000
Permitting	$ 10,000
Total	$159,000

$ 162.25 / ft^2

Concrete Superstructure Alternative $ **82,000**

Case Studies Modular Beams

Minneapolis, MN

Sevier River Bridge. Axtell, UT

Fabricator: Wheeler Bridge
Contractor: Gerber Construction

75 ft long, 28 ft wide Modular Rolled Beam

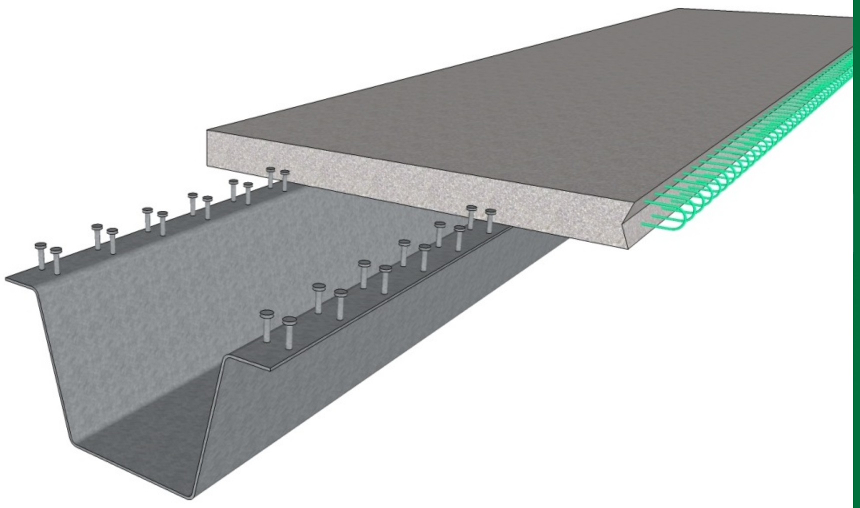
Schoepps Valley Road, Waumandee, WI

Fabricator: Wheeler
Contractor: JF Brennan

Three-Simple-Span (3 x 48 ft) with 24 ft Roadway
Emergency Replacement During Winter Months

Press-Brake-Formed Steel Tub Girders

- Modular shallow trapezoidal boxes fabricated from cold-bent structural steel plate
  - o Weathering steel or galvanized.
- Reduction in fabrication costs due to cold-bending versus welding of the section and mass production.
- Reduces need for stiffeners and cross frames.
- Advantages include:
  - o Accelerated with precast deck (install in 1 or 2 days)
  - o Modular
  - o Simple to fabricate and install



SSSBA Research Started in 2012
First PBTG Bridge Built in 2015
(However, Michigan Installed One in 2004)

Press-Brake Tub Girder – Contractor Built

Barron County, WS

Fabricator: Valmont

Contractor: Larson Construction

Existing Structure

3-Span Timber Slab

96 ft Length

Deterioration and Deficient

Replacement Structure Requirements

Two Span

104 ft Length

Increased Hydraulic Opening and Clearance

Press-Brake Tub Girder – Contractor Built

valmont

Press-Brake Tub Girder – Contractor Built

Press-Brake Tub Girder

Other Finishing Fabrication

Pre-Decked - Composite

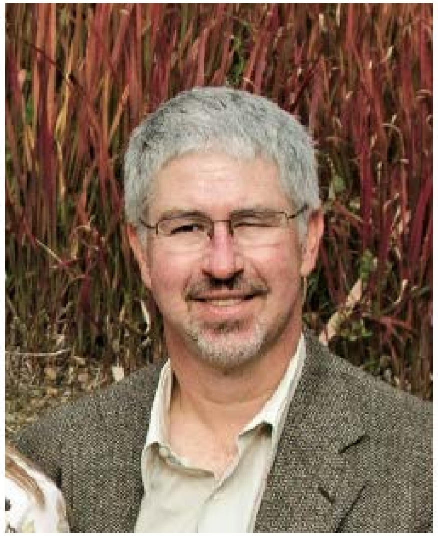
- PBTGs Pre-Decked
- Closure Pours
- CIP Curbs

Field Assembly - Composite

- PBTGs no Deck
- Precast Deck Panels
- Grouted Shear Pockets
- Closure Pours
- CIP Curbs

DIY: Building Bridges with County Crews

- 220,000 bridges in the United States need major repair work or should be replaced.
- Counties own 40 percent of the nation's bridges
- Cost-effective and sustainable solutions are needed
- One option is to use county crews for bridge installations
- Whitman County, Washington saved over $30,000 by using local crews to install a prefabricated steel bridge



"I think we can build a bridge for about half of what the contracting community can do."
Mark Storey, P.E.
Director/County Engineer
Whitman County, Washington
Public Works

DIY County Bridges Education Packet

- Purpose of Education Packet
  - Counties can build their own bridges
  - Counties can save money (and build more bridges)
  - Accelerate construction & minimize public inconvenience
  - Develop county work force and use County equipment

- Topics in Workshop
  - Can Your County Build this Bridge?
  - Planning, Permits, Environmental Issues & Geotech Considerations
  - Selecting Bridge Type and Bidding Award
  - Foundation and Substructure Design & Installation
  - Installing the Bridge
  - Commissioning and Opening to Traffic

DIY County Bridges – Learn by Example

Belmont Bridge Replacement, Whitman County, WA

Existing Wood Bridge
20 ft long / 22 ft wide

New Bridge
30 ft long / 28 ft wide
TrueNorth Modular Steel Bridge
Installed by County Crew

Video https://www.shortspansteelbridges.org/county-saves-steel/

DIY: Building Bridges with County Crews Workshops

- NACE 2022 One Hour Presentation
  - Michael Barker & Mark Storey
  - Well Received - Much Interest

- NACE 2023 2 Hour Workshop
  - County Engineer Panel
  - Great Success

Bridge Bundling & the Bridge Infrastructure Law

- Bridge Infrastructure Law – Bridge Investment Program (BIP) 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.

$40 million per year for Tribal bridges

Up to 5% for culverts

$20 million per year for Planning grants

15% for off-system bridges

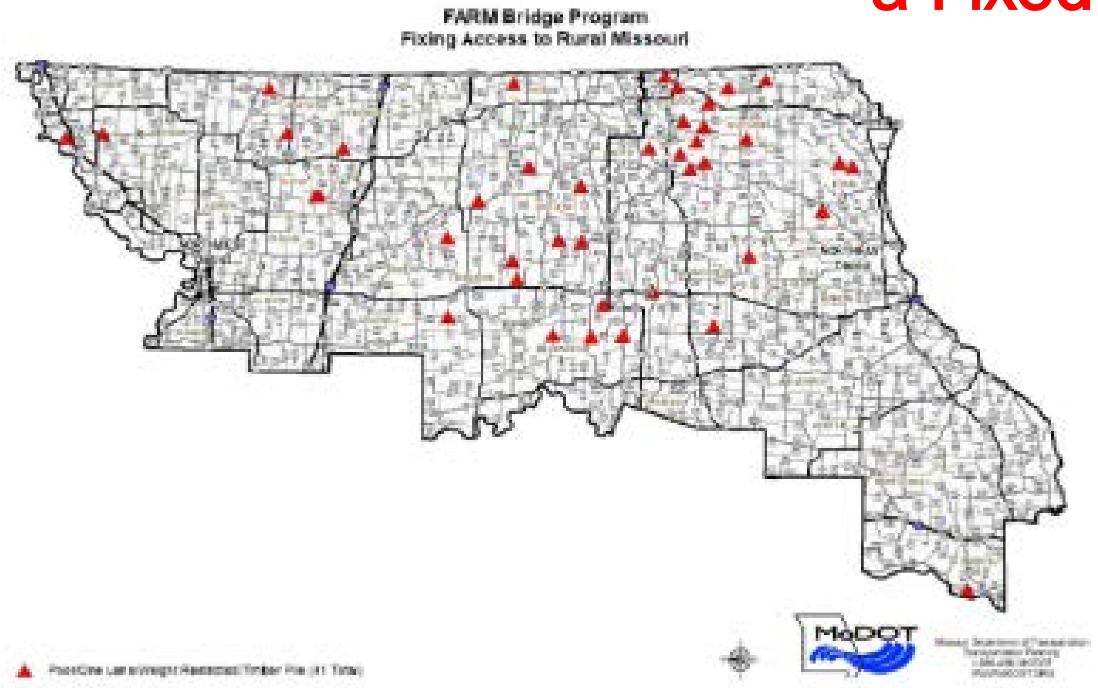
Missouri DOT Design-Build Bridge Bundling

- 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)

FARM Design-Build Bridge Bundling Project

- Fixing Access to Rural Missouri (FARM)
- MoDOT identified 40 rural bridges in northern Missouri for Replacement

Best Value for a Fixed Budget



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

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

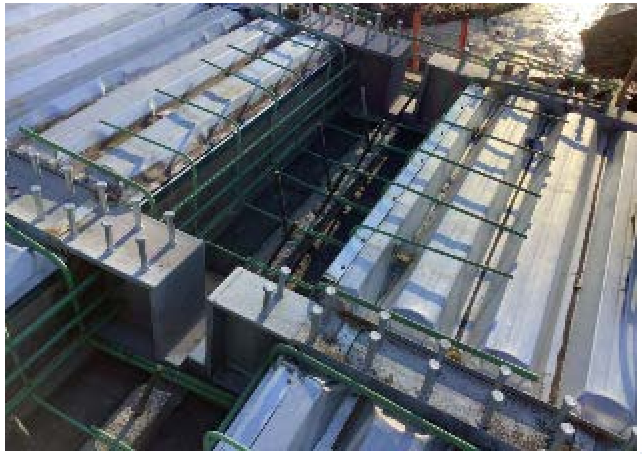
FARM Design-Build Bridge Bundling Project

- 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 Life (SDCL)

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






Advantages for SDCL

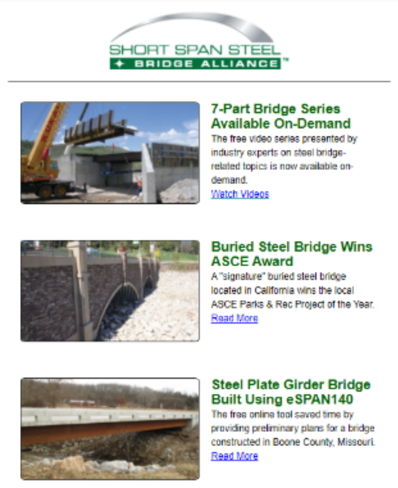
- Ease of construction
- Eliminates the use of traditional field splices
- Flexible & economical span ratios
- Customize beams to the spans
- Simple details make steel fabrication much more competitive
  - Certified Bridge Fabricator – Simple Bridge (SBR)
  - ~~Certified Bridge Fabricator – Intermediate 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”

Summary: Today's Steel Bridges

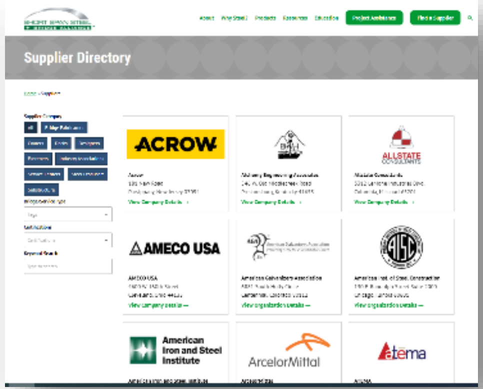
State of the Art & Innovative Designs
Durable
Speed of Construction – Accelerated Bridge Construction
Cost Effectiveness
Sustainability
Resiliency

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

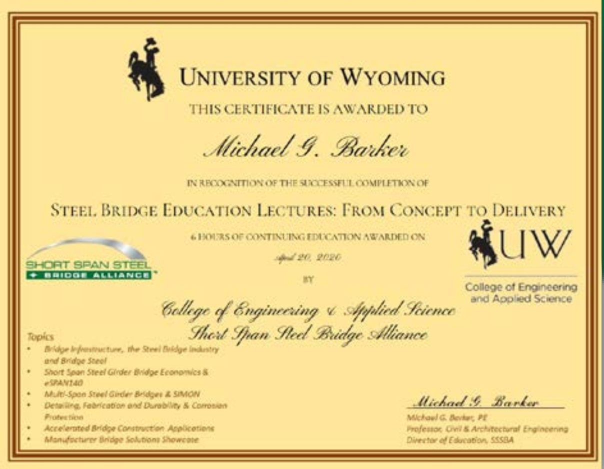
5. Schedule a Workshop/Webinar

www.ShortSpanSteelBridges.org

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

Website:	**ShortSpanSteelBridges.org**
Twitter:	**@ShortSpanSteel**
Facebook:	**Short Span Steel Bridge Alliance**

Online University Lecture Part I:
Steel Bridges From Concept to Delivery

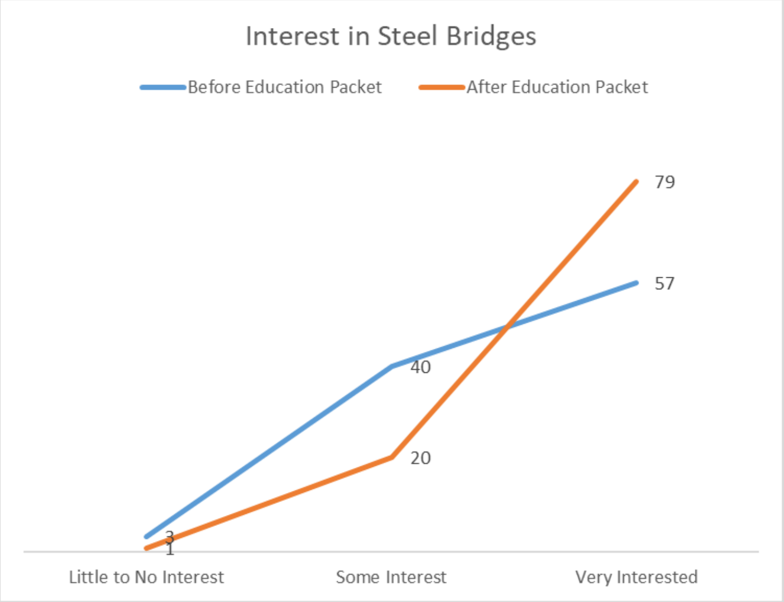


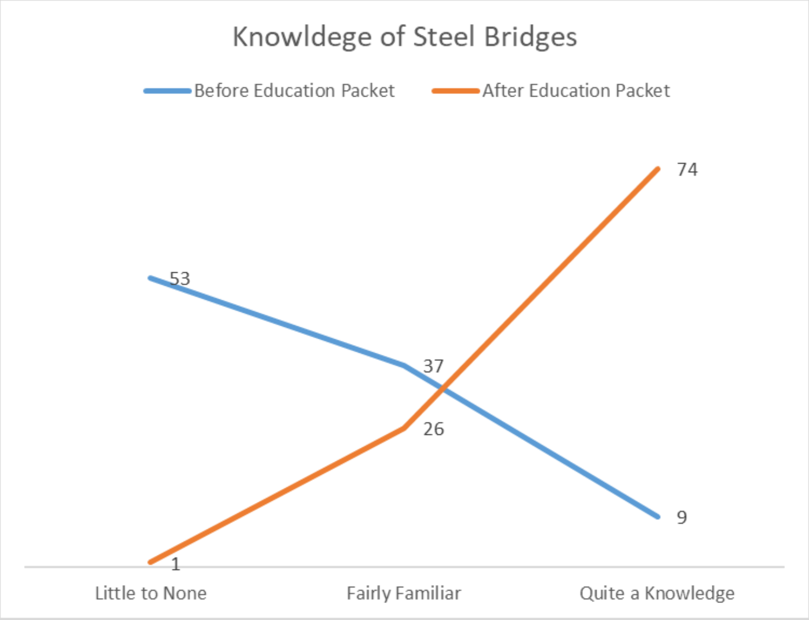
Getting Students, Faculty and Young Engineers Familiar with Steel Bridges and the Steel Bridge Industry

Steel Bridge Education Lectures: From Concept to Delivery

10 Workshops thru 2023
Over 1400 Certificates Awarded
Over 3000 Registered
One Planned for Feb 18 – Mar 6, 2025

Lecture 1: Bridge Infrastructure & the Steel Bridge Industry
Lecture 2: Short Span Steel Girder Economics & eSPAN140
Lecture 3: Multi-Span Steel Girder Bridges & SIMON
Lecture 4: Detailing, Fabrication and Durability & Corrosion Protection
Lecture 5: Accelerated Bridge Construction Applications
Lecture 6: Manufacturer Bridge Solutions Showcase



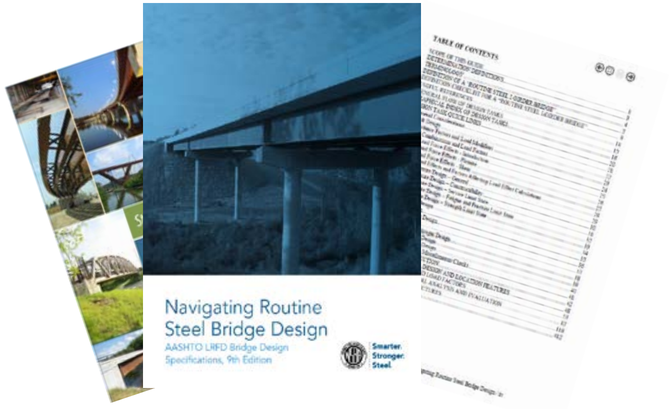


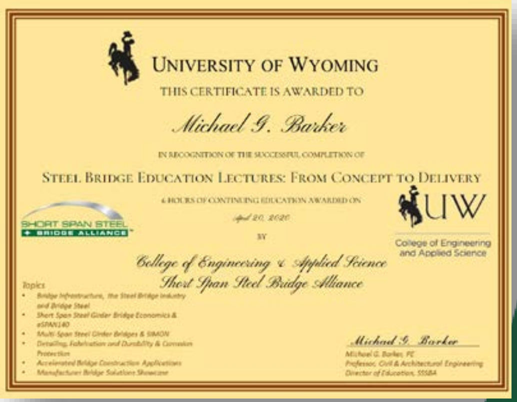
New Online University Lecture Part II:
Simple Span Bridge Design

6-part steel bridge design education packet based on NSBA Navigating Routine Steel Bridge Design

Similar Online Certificate Program to Steel Bridges from Concept to Delivery

Target Audience:
University Students
Young Professionals

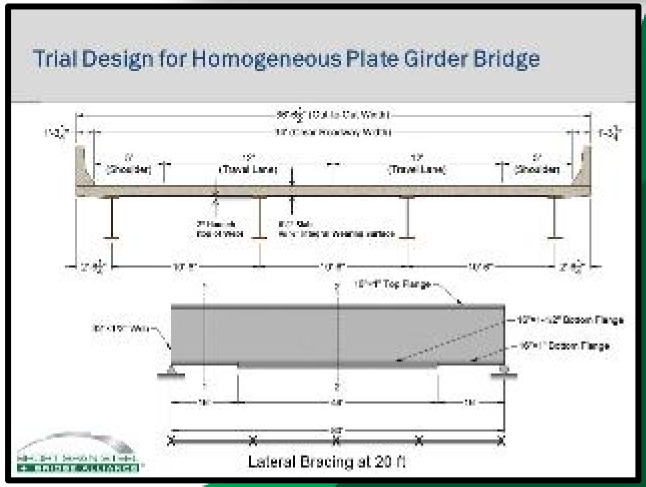




First Offering in 2024

80 ft Simple Span Plate Girder Design

- Lecture 1: Introduction & Trial Bridge Design
- Lecture 2: Bridge Design
- Lecture 3: Bridge Analysis & Design Limit States
- Lecture 4: Strength Design
- Lecture 5: Serviceability & Construction Design
- Lecture 6: Detailing & Final Thoughts



First Offering in Fall 2025

Workshops: Professional

Free Customized Workshops for Counties, DOTs, and Design Firms

Topics: Education, Events, Professional, Recommended

Short span bridges provide vital links in the nation's infrastructure network. Yet, nearly a quarter of these bridges are classified as structurally deficient or functionally obsolete.

According to ASCE, more than 30% of existing bridges have exceeded their 50-year design life. This situation presents a significant challenge for cash-strapped state and local governments.

The SSSBA has developed technological and design innovations for bridges under 140 feet that save significant time and costs for county and state bridge officials.

Over the past 10-years, over 5,000 bridge owners and designers have learned about the cost and time advantages of short span steel bridges in SSSBA workshops and conferences throughout North America.

And now, the SSSBA is offering **complimentary** customized educational guest speakers/webinars and workshops (on-site or virtual) specifically for county engineers, state DOTs, and design firms. The webinars/workshops are taught by industry experts with decades of experience in the cost-effective design and construction of short span bridges.

The workshops can be set up as:

- 1-2 hour webinar on a specific topic (can be used as a "guest speaker" for your event).

TRB Low Volume Roads Conference

Barron County, Wisconsin

SSSBA Semi-Annual Meeting

SHORT SPAN STEEL BRIDGE ALLIANCE

Short Span Steel Bridge Workshops

Over the past 10-years, over 5,000 bridge owners and designers have learned about the cost and time advantages of short span steel bridges in SSSBA workshops and conferences throughout North America.

And now, the SSSBA is offering **complimentary** customized educational workshops (on-site or virtual) specifically for county engineers, state DOTs, and design firms. The workshops are taught by industry experts with decades of experience in the cost-effective design and construction of short span bridges.

The workshops can be set up as:

- 1-2 hour webinar on a specific topic.
- 3-4 hour (half-day) workshop to provide practical information on the safe and cost-effective design, detail, fabrication and installation of short span steel bridges.
- 6 hours (full-day) session to provide an in-depth overview of short span steel bridges.

Suggested topics to select from include:

- Practical & Cost-Effective Steel Bridge Design
- Free Design Tools (eSPAN140 and SIMON)
- Pre-engineered Bridge Solutions
- Coating Solutions (galvanized, painted, and weathering steel)
- Accelerated Bridge Construction Options
- Case Studies (from local counties)
- Buried Soil Steel Bridge Structure Alternatives
- Life-Cycle Analysis

Sample Workshop Agenda (can also be altered for a virtual meeting)

4-Hour Workshop Agenda

00:00 (40 min) Introduction, Short Span Steel Bridge Overview & Design Tools (eSPAN140)
00:40 (35 min) Bridge Economy & Life Cycle Costs
01:15 (35 min) Steel Bridge Case Study
01:50 (25 min) Break (networking)
02:15 (35 min) National Steel Bridge Alliance Design Resources & SIMON (design software)
02:50 (35 min) Buried Steel Bridges Design & Construction
03:25 (35 min) Pre-Fabricated Steel Bridges & Accelerated Bridge Construction
04:00 Adjourn
** Each presentation will allow 5-10 minutes of Q&A*

6-Hour Workshop Agenda

00:00 (45 min) Introduction, Short Span Steel Bridge Overview & Design Tools (eSPAN140)
00:45 (40 min) Bridge Economy & Life Cycle Costs
01:25 (35 min) Steel Bridge Case Study
02:00 (25 min) Break (networking)
02:25 (40 min) National Steel Bridge Alliance Design Resources & SIMON (design software)
03:05 (35 min) Practical Detailing, Durability and Steel Protection Systems
03:40 (40 min) Press-Brake Tub Girder Bridges
04:20 (25 min) Break (Lunch?)
04:45 (35 min) Buried Steel Bridges Design & Construction
05:20 (40 min) Pre-Fabricated Steel Bridges & Accelerated Bridge Construction
06:00 Adjourn
** Each presentation will allow 5-10 minutes of Q&A*

Contact Dan Snyder, Director of the SSSBA, for more information (dsnyder@steel.org – 301-367-6179)

www.ShortSpanSteelBridges.org

Online Webinars: Professional – New This Year

American Galvanizers Association
Protecting Steel for a Sustainable Future

SHORT SPAN STEEL BRIDGE ALLIANCE™

Building Better Bridges in 2025: Webinar Series

Feb 19th 1pm ET - Steel vs. Concrete Life Cycle Performance and Costs

April 23rd 1pm ET - Unlocking the Potential of Buried Steel Structures

Sept 10th 1pm ET –Next-Gen Steel Bridge Design Tools for Smarter Solutions

Dec 10th 1pm ET – Simple for Dead, Continuous for Live Designs for Optimal Performance

www.ShortSpanSteelBridges.org

Workshop: DIY County Bridges in 6 Steps

6-part Education to Potentially 3000 Counties on How They Can Build Their Own Bridges

Based on Whitman County, WA, Experience

Workshop Benefits

- Save Money and Build More Bridges!
- Workforce Development
- Minimize Public Inconvenience
- Accelerate Construction
- Use/Share County Equipment

Agenda (4 hours, including breaks)

- Module 1: Can My County Build This Bridge? (35 minutes)
- Module 2: Permits, Environmental Issues and Geotech Considerations (35 minutes)
- Module 3: Selecting Bridge Type and Bidding an Award (35 minutes)
- Module 4: Foundation and Substructure Design/Installation (35 minutes)
- Module 5: Installing the Bridge (35 minutes)
- Module 6: Commissioning and Opening to Traffic (35 minutes)

So You Want to Build a Bridge (and Save Money)?

DIY County Bridges in 6 Steps

SHORT SPAN STEEL BRIDGE ALLIANCE™

Workshop Overview

Our nation is facing an infrastructure crisis. More than 220,000 bridges in the United States need major repair work or should be replaced. Nationwide, counties own and maintain 40 percent of the nation's bridges, making them the single largest stakeholder in local road and bridge construction, rehabilitation, expansion and maintenance.

This situation presents a significant challenge for cash-strapped state and local governments. To responsibly fix our nation's county bridges, cost-effective and sustainable solutions are needed – one option is to use county crews to assist with steel bridge installations. For example, Whitman County, Washington officials saved over $30,000 by using local crews to install a prefabricated steel bridge (watch video). Audrain County, Missouri officials saved nearly 20 percent in the total cost of the structure using county crews to install a short span steel beam bridge (watch video).

To assist counties in saving time and money by using local crews, the Short Span Steel Bridge Alliance (SSSBA) developed an educational workshop to explain and simplify the process. Input from Whitman County officials and several other counties was collected to develop the workshop, "So You Want to Build a Bridge? DIY County Bridges in 6 Steps."

"I think we can build a bridge for about half of what the contracting community can do."
Mark Storey, P.E.
Director/County Engineer
Whitman County, Washington Public Works

In the past 10 years, more than 15,000 bridge owners and designers have attended SSSBA workshops to learn about the cost and time advantages of short span steel bridges. Please join us for this entertaining and engaging educational adventure certain to save you time and money in future county bridge installations.

Sample Video

https://www.shortspansteelbridges.org/county-saves-steel/

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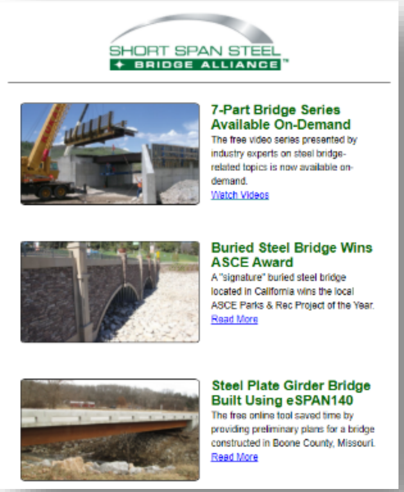

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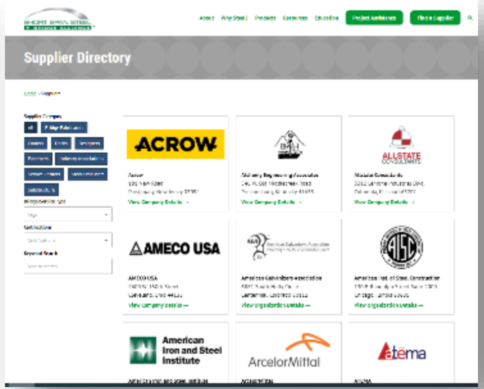

3. Design a Bridge in 5-Minutes

eSPAN140™

4. Receive Free Project Assistance

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

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