CONTECH ENGINEERED SOLUTIONS

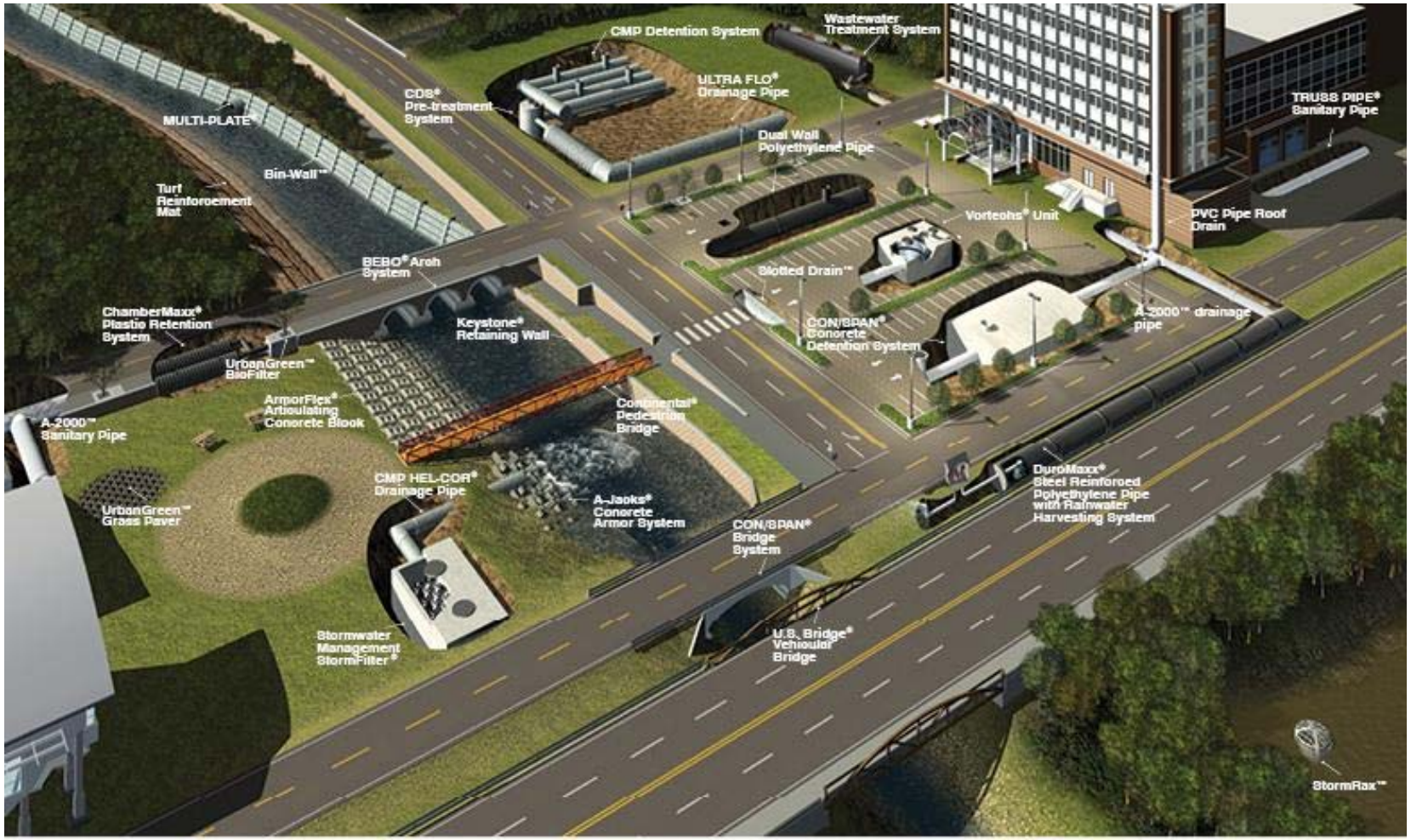
ABCD Technical Seminar

Accelerated Bridge Construction with Precast Structures

Richard Tate and Kevin Grant

CONTECH
ENGINEERED SOLUTIONS

Contech Engineered Site Solutions



Bridge, Drainage, Erosion Control, Retaining Walls, Sanitary, Soil Stabilization, Stormwater, Wastewater Treatment

www.ContechES.com

CONTECH ENGINEERED SOLUTIONS

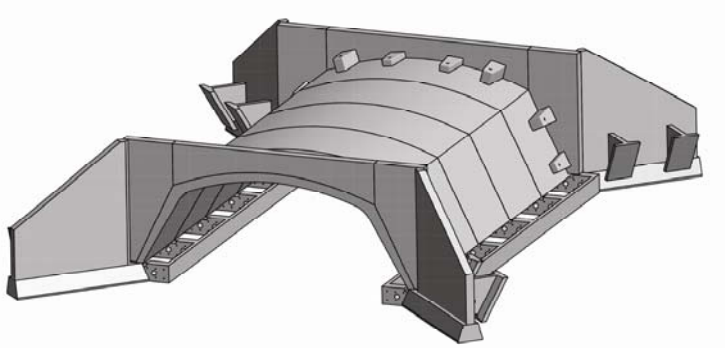
Contech. Your project partner.

- Bridge, Erosion Control, Pipe, Retaining Wall, Stormwater and Wastewater Treatment Solutions
- Over 60 Engineers and CAD Specialists
- 200 Sales Engineers and Project Consultants covering all 50 States
- Over 100 years experience in the Construction Industry

CONTECH ENGINEERED SOLUTIONS

Contech. Your project partner.

- Summary & Overview Bridge Portfolio
- Innovative Bridge Developments
- Engineering Support & Design Tools
- Contech's Consultative Approach



Building Blocks to a successful Project

Planning & Solution Development

- Project Design Worksheet
- Structure Selection
- Siting & Layout
- DYOB
- Engineer Estimate
- Site Simulation
- Proposal Preparation
- Design Build Support

Design Support

- Specifications
- Contract Drawings
- Permitting
- Structural/Fabrication Drawings
- Approval Assistance
- Custom Shape Development
- Horizontal/Vertical Alignment
- Hydraulics & Scour Support
- Foundations

Installation Support

- Preconstruction Meeting
- On-Site Installation Assistance
- Logistics Coordination

CONTECH ENGINEERED SOLUTIONS

FHWA Accelerated Bridge Program

U.S. Department of Transportation
Federal Highway Administration

CONTECH ENGINEERED SOLUTIONS

Accelerated Bridge Program

U.S. Department of Transportation
Federal Highway Administration

***Accelerated Bridge Construction (ABC)*:**

- ABC is bridge construction that uses innovative planning, design, materials, and construction methods in a safe and cost-effective manner to reduce the onsite construction time that occurs when building new bridges or replacing and rehabilitating existing bridges

Prefabricated Bridge Elements and Systems

- PBES are structural components of a bridge that are built offsite, or near-site of a bridge and include features that reduce the onsite construction time and the mobility impact time that occurs when building new bridges or rehabilitating or replacing existing bridges relative to conventional construction methods.

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Connection Details for Prefabricated Bridge Elements and Systems

March 30, 2009

Publication No. FHWA-IF-09-010

U.S.Department of Transportation
Federal Highway Administration

Priority, Market Ready Technologies and Innovations

HIGHWAYS FOR LIFE
Accelerating Innovation for the American Driving Experience

Figure 2.4.3-1 depicts a proprietary arch system call the Con/Span® Bridge System. This system, including the arch elements, the spandrel walls, the wingwalls and the footings, can be completely made with precast concrete elements. The connections shown in Figure 2.4.3-1 are described in the following sections.

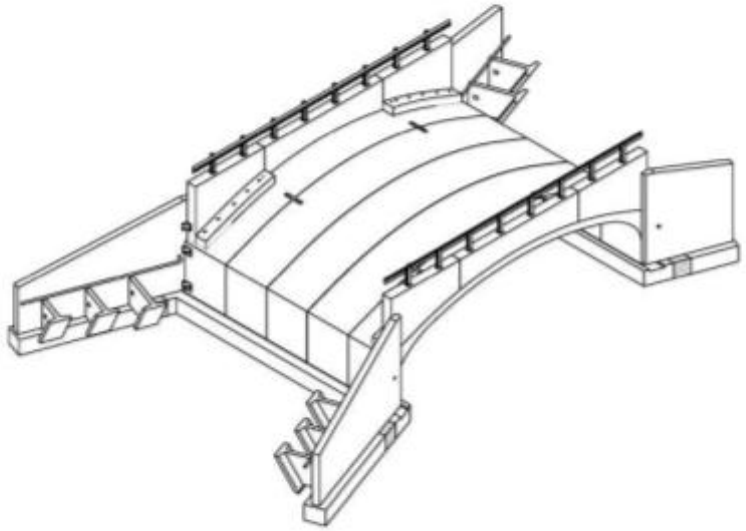


Figure 2.4.3-1 Con/Span® Bridge System

Page 2-181

"Prefabricated elements of a bridge produced off-site can be assembled quickly, and can reduce design time and cost, minimize forming, minimize lane closure time and/or possibly eliminate the need for a temporary bridge."

CONTECH ENGINEERED SOLUTIONS

Bridge Overview
Plate, Precast &Truss

CONTECH STRUCTURAL PLATE

CONSPAN BRIDGE SYSTEMS

BEBO Arch Systems

CONTINENTAL BRIDGE

EXPRESS

U.S. BRIDGE
BRIDGING AMERICA SINCE 1936

CONTECH ENGINEERED SOLUTIONS

Plate, Precast & Truss

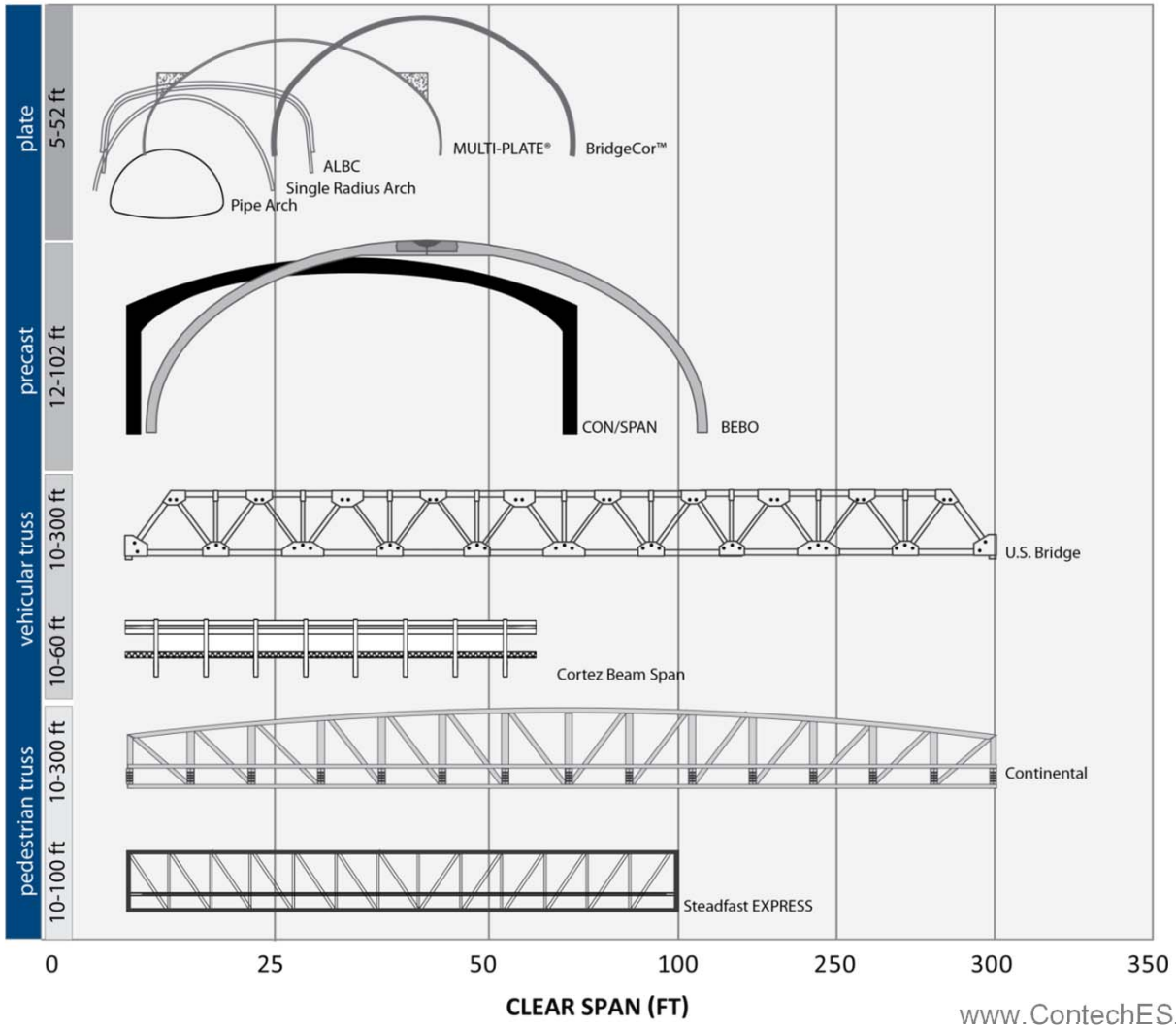
MULTI-PLATE®
Aluminum Structural Plate
Aluminum Box Culvert
SUPER-SPAN™
SUPER-PLATE®
BridgeCor™

CON/SPAN®
BEBO®

U.S. Bridge (Vehicular)

Continental® Bridges
(Pedestrian)

Steadfast EXPRESS
(Pedestrian)



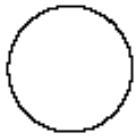
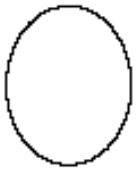
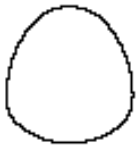
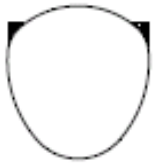
CONTECH ENGINEERED SOLUTIONS

Contech Structural Plate

CONTECH STRUCTURAL PLATE

CONTECH®
ENGINEERED SOLUTIONS

Structural Plate Shapes

Shapes		Sizes — Span x Rise
Round		5′ to 26′
Vertical Ellipse		4′8″ x 5′2″ to 25′ x 27′7″
Underpass		12′2″ x 11′0″ to 20′4″ to 17′9″
Pipe-Arch		6′1″ x 4′7″ to 20′7″ x 13′2″
Horizontal Ellipse		7′4″ x 5′6″ to 14′11″ x 11′2″
Arch (single radius)		5′ x 1′9″ to 25′ x 12′6″
Low-Profile Arch *		20′1″ x 7′6″ to 45′0″ x 18′8″
High-Profile Arch *		20′1″ x 9′1″ to 35′4″ x 20′0″
Pear-Arch		23′-11″ x 23′-4″ to 30′-4″ x 25′-10″
Pear		23′-8″ x 25′-5″ to 29′-11″ x 31′-3″
Horizontal Ellipse		19′4″ x 12′9″ to 37′2″ x 22′2″
Box Culvert		8′9″ x 2′6″ to 35′-3″ x 13′-7″

CONTECH ENGINEERED SOLUTIONS

Precast – CON/SPAN and BEBO Concrete Arches

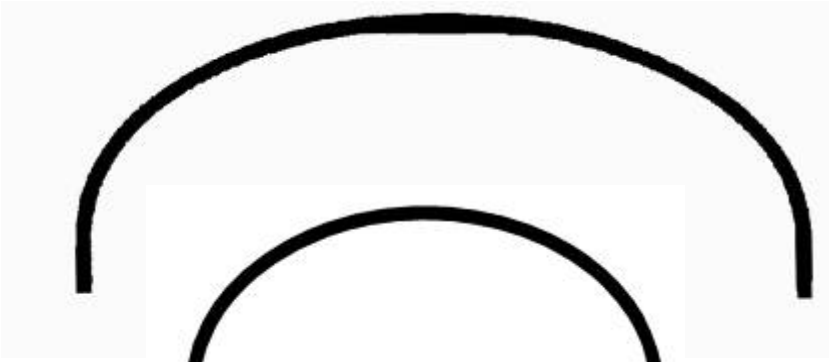
CON/SPAN® BRIDGE SYSTEMS

BEBO® Arch Systems

CONTECH ENGINEERED SOLUTIONS

Precast Bridge Arches

CON/SPAN®



BEBO® E-Series

BEBO® C-Series

BEBO® T-Series

CONTECH ENGINEERED SOLUTIONS

Truss Bridges – Pedestrian and Vehicular

CONTINENTAL BRIDGE

EXPRESS™

U.S. BRIDGE
BRIDGING AMERICA SINCE 1930

CONTECH ENGINEERED SOLUTIONS

Pedestrian Truss Bridge Styles

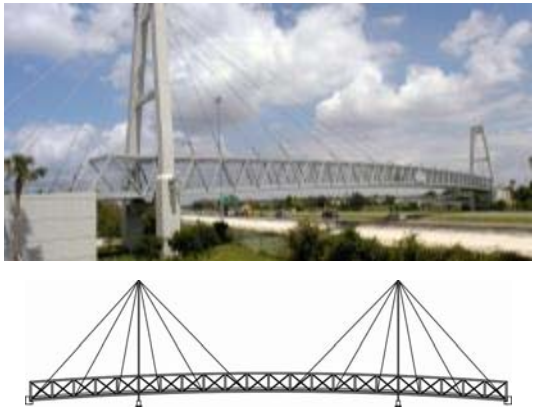
Connector®

Capstone®

Keystone®

Gateway®

Link®



Cable Stayed

CONTINENTAL BRIDGE

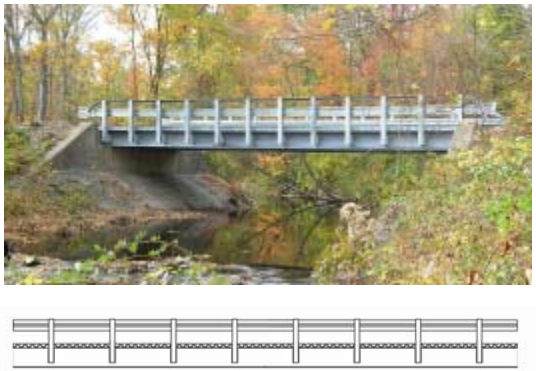
CONTECH ENGINEERED SOLUTIONS

Vehicular Truss Bridge Designs

The Cambridge

The Cambridge Flat

The Seneca



The Cortez

The Viking

U.S. BRIDGE. BRIDGING AMERICA SINCE 1916

CONTECH ENGINEERED SOLUTIONS

CONSPAN BRIDGE SYSTEMS

BEBO Arch Systems

CONTECH STRUCTURAL PLATE

CONTINENTAL BRIDGE EXPRESS

U.S. BRIDGE

Precast	Plate	Truss
50 years	80 years	60 years
8,000 installations	50,000 installations	20,000 installations
……. Comprehensive Engineering Support ……..		
…….Installations In Every State……..		

CONTECH
ENGINEERED SOLUTIONS

Applications






CONTECH
ENGINEERED SOLUTIONS

Applications






CONTECH ENGINEERED SOLUTIONS

CONTECH STRUCTURAL PLATE | CON SPAN BRIDGE SYSTEMS | BEBO Arch Systems | CONTINENTAL BRIDGE | EXPRESS | U.S. BRIDGE

A new generation of innovation…

1 CON SPAN. -SERIES

2 BridgeCor™

3 EXPRESS™ Foundations

4 U.S. BRIDGE® BRIDGING AMERICA SINCE 1936 Thru Truss

CONTECH ENGINEERED SOLUTIONS

Innovation #1:

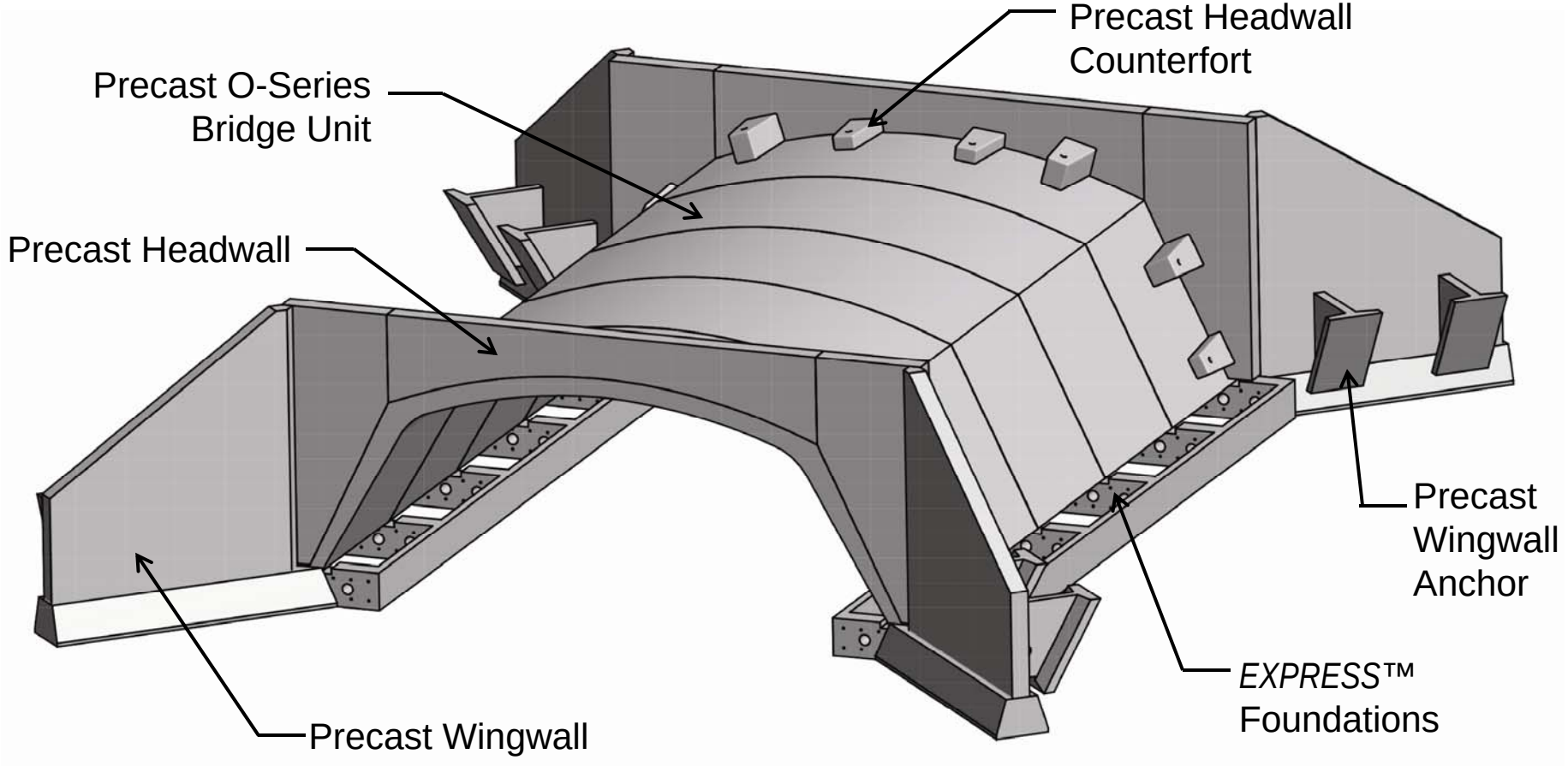
CONTECH ENGINEERED SOLUTIONS

CON/SPAN O-SERIES

A Legacy of Innovative Technologies...

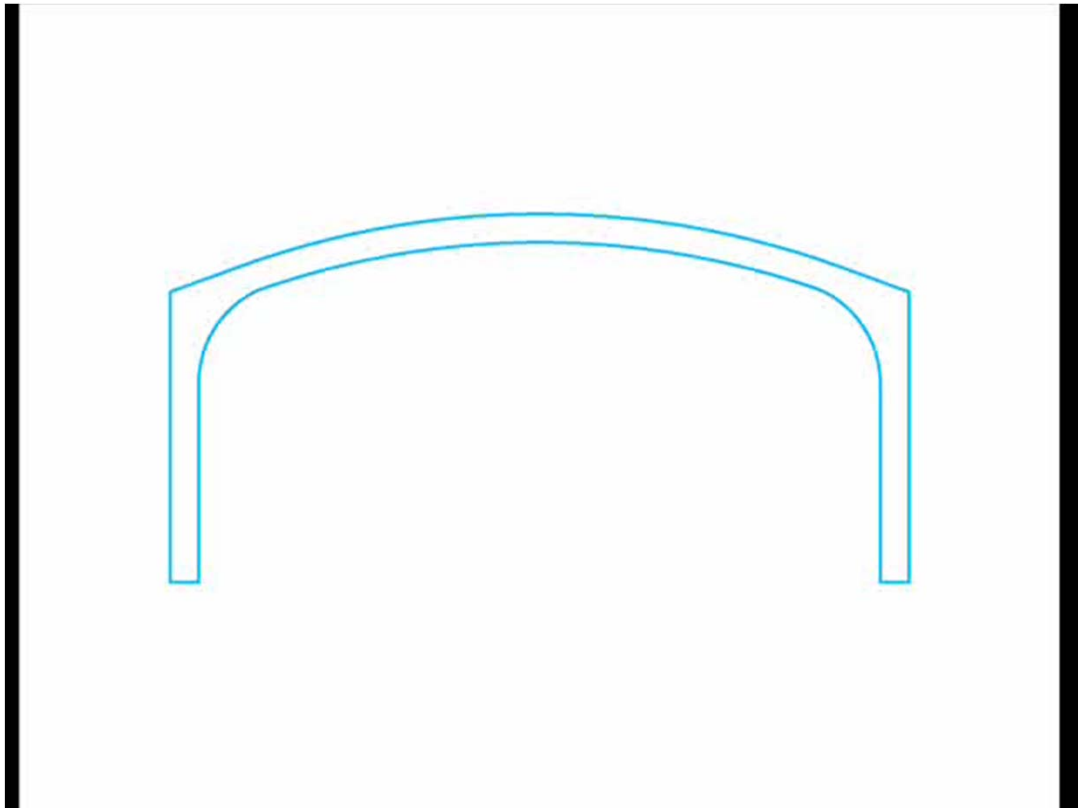
CONTECH ENGINEERED SOLUTIONS

CON SPAN O-SERIES



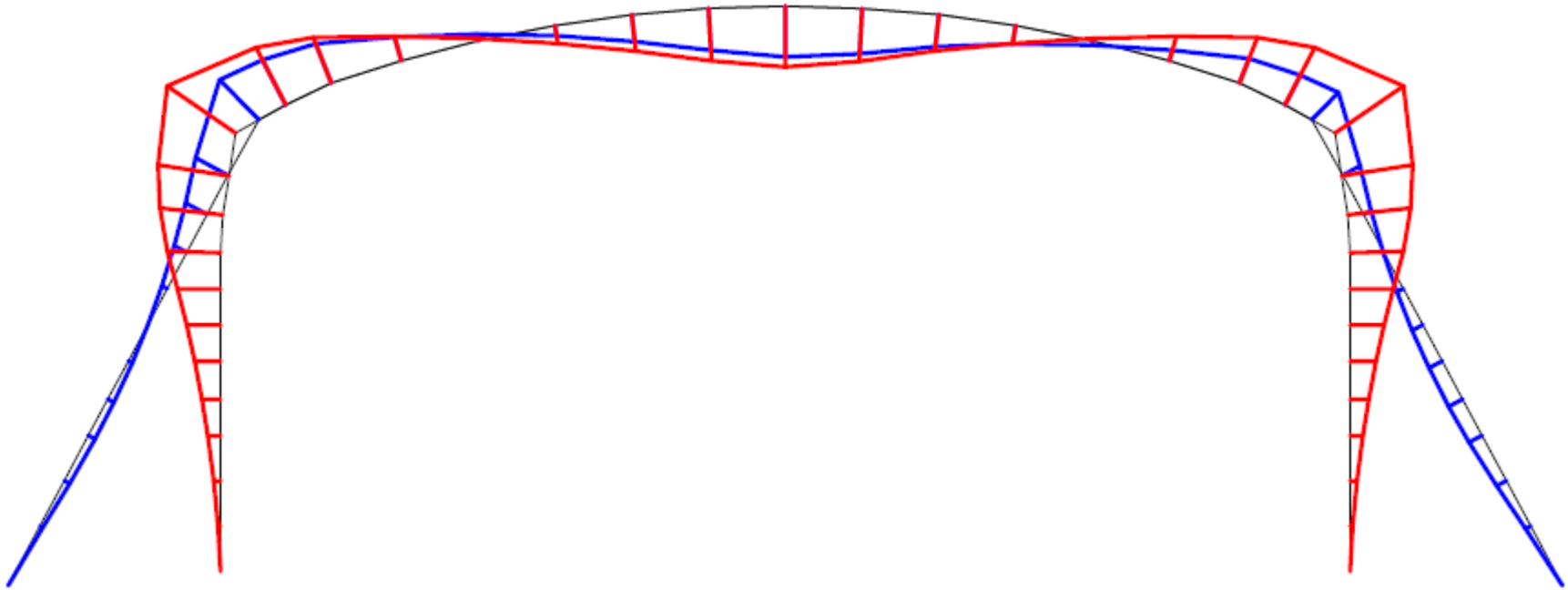
CONTECH
ENGINEERED SOLUTIONS

CON SPAN® O-SERIES™



CONTECH ENGINEERED SOLUTIONS

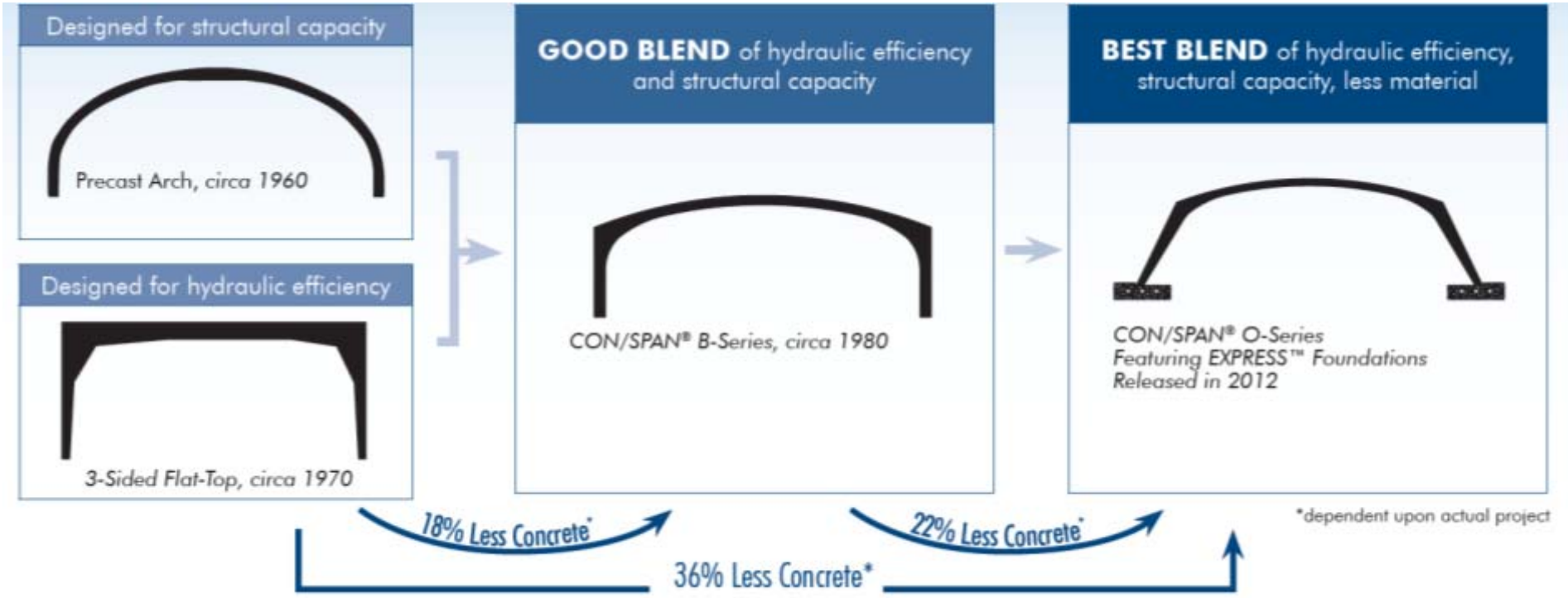
O-Series Moment Reduction



- Moment Diagram for HS25 Live Load, 2’-0” Cover
- O-Series results in:
  - Maximum positive and negative moment reduced
  - Required A1 and A3 steel areas *reduced*

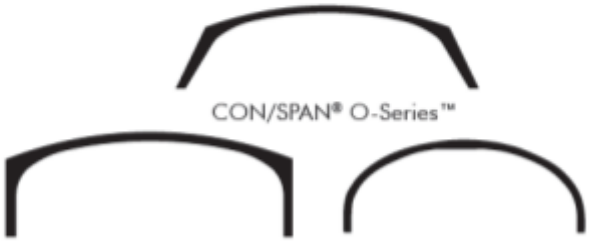
CONTECH®
ENGINEERED SOLUTIONS

Taken to the Next Level of Optimization



CONTECH®
ENGINEERED SOLUTIONS

Any Application, Many Solutions – You Optimize

Wetlands & Clear Spanning	Hydraulic Optimization	Clearance Box/Grade Separation Optimization
		
 CON/SPAN® O-Series™	 CON/SPAN® O-Series™	 CON/SPAN® O-Series™ CON/SPAN® B-Series BEBO® Arch
Maximizing span for sensitive environmental conditions.	**Maximizing** waterway and span area for hydraulic efficiency.	**Minimizing** excess materials, while closely matching clearance diagram.

CONTECH®
ENGINEERED SOLUTIONS

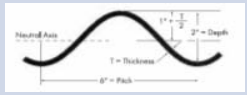
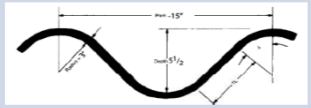
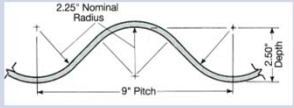
Duanesburg-Churches Road Bridge Replacement
Duanesburg, New York

CONTECH®
ENGINEERED SOLUTIONS

Innovation #2:

BridgeCor™

CONTECH®
ENGINEERED SOLUTIONS

	MULTI-PLATE	BridgeCor	Aluminum Structural Plate
Corrugation Profile			
Corrugation	6” x 2”	15” x 5 ½”	9” X 2 ½”
Corrugation Benefit	Standard structural plate profile Broadens size range over CMP	Deeper corrugation adds strength and stiffness Allows for longer spans and material efficency	Corrugation used for ALSP and ALBC structures
Common Span Applications	> 5’ - < 26’	> 20’ - < 65’	> 6’ - < 36’
Gage Benefit	Stiffer and Stronger than conventional CMP	Lighter gages in wider spans provides additional design options	Used in conjunction with ribs to provide strength Longest durability in the industry

CONTECH ENGINEERED SOLUTIONS

BridgeCor™

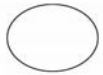
Applications

- Wetland / Wildlife Crossings
- Mining or Heavy Loading Conditions
- Railroad
- Convert Conventional Bridges to Buried Structures

Specifications

- AASHTO Section 12.8.9
- AASHTO LRFD 12.9
- AASHTO M-167
- ASTM A-761

Available Shapes

Invert Structures		
	Round	19′-50′ Diameter
	Ellipse	Custom Sizes
Arch Structures		
	Single Radius Arch	22′-54′ Spans
	Multiple Radius Arch	22′-50′ Spans *(Up to 65′ custom)*
Box Culverts		
	Box Culvert	18′-35′ Spans *(Up to 45′ custom)*

CONTECH® ENGINEERED SOLUTIONS

Design Challenge »

- **Structure** – 2-radius arch
- **Stream width** – 40′ clear span required
- **Application** – wildlife crossing
- **Length** – 260′

	SUPER-SPAN	BridgeCor
Corrugation	6"X2"	15"X5.5"
Structure	138A39	28A8
Span	42'-3"	42'-7"
Rise	15'-5"	15'-6"
End Area	510 sf	525 sf
Min. Cover	48"	30"
Gage	1	7
Weight/Ft.	940	680
Total Weight	244,400 lbs	176,800 lbs
Number of Trucks	6	4

A MINIMUM 35% COST SAVINGS

NOTE: A minimum of 35% cost savings for an erected structure. Total structure weight is less. Less trucks to the jobsite. In a low cover application, the SUPER-SPAN® will not meet specification design requirements.

A Simple Cost Comparison

BridgeCor™ VS CONTECH® STRUCTURAL PLATE

- **BridgeCor - 35% cost savings for an installed structure**
  - Lower overall assembly cost
  - Eliminates SUPER SPAN thrust beams
  - Reduces the amount of monitoring required
- ▪
- **BridgeCor - Weight is less than SUPER SPAN**
  - 2 less trucks to the jobsite
- **BridgeCor - Less soil cover than SUPER SPAN**
  - At 3.0 feet of cover a SUPER SPAN structure design will not work

CONTECH ENGINEERED SOLUTIONS

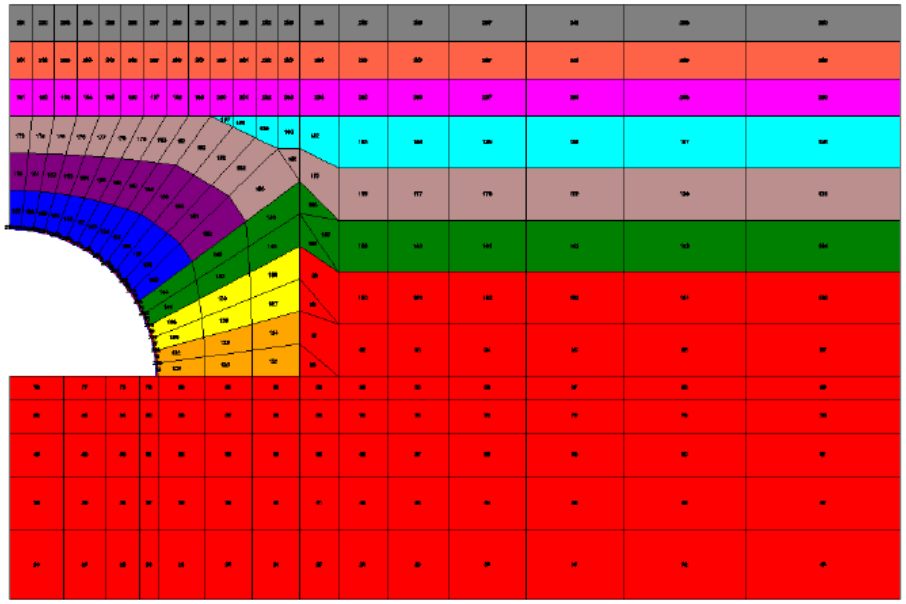
Building Blocks to a Successful Project

Solution Development

Design Support

Installation

- Finite element analysis to optimize structure gage per AASHTO



- Certified BridgeCor assemblers are available

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Pierre Creek Culvert Replacement
Boyds, Washington

CONTECH ENGINEERED SOLUTIONS

Innovation #3:

EXPRESS™ Foundations

CONTECH
ENGINEERED SOLUTIONS

Cast-in-place

Precast foundation
(minimal continuity)

Precast Foundation with
closure pour

EXPRESS™ Foundations

CONTECH
ENGINEERED SOLUTIONS

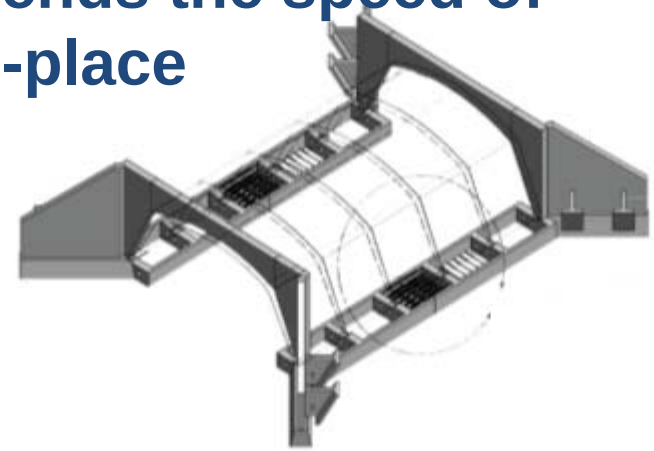
EXPRESS™ Foundations

A precast foundation system that blends the speed of precast with the economy of cast-in-place

CONTECH ENGINEERED SOLUTIONS

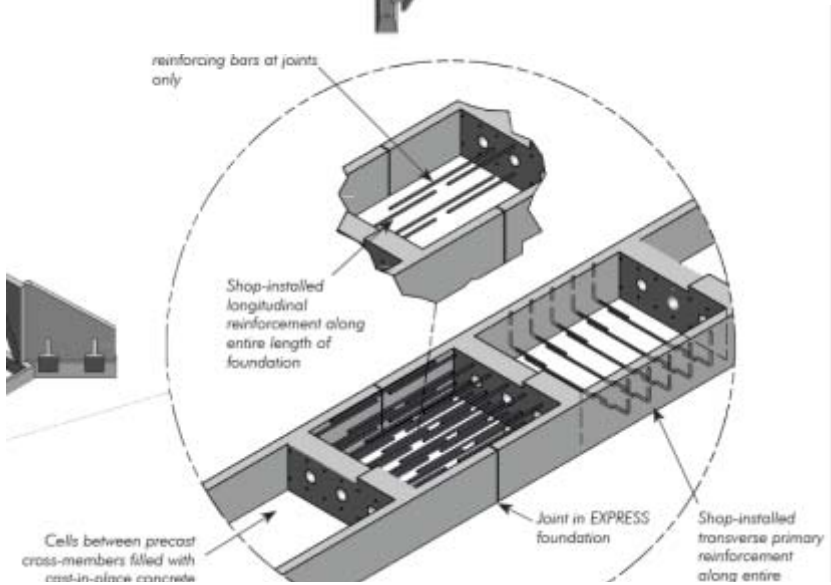
EXPRESS™ Foundations

A precast foundation system that blends the speed of precast with the economy of cast-in-place



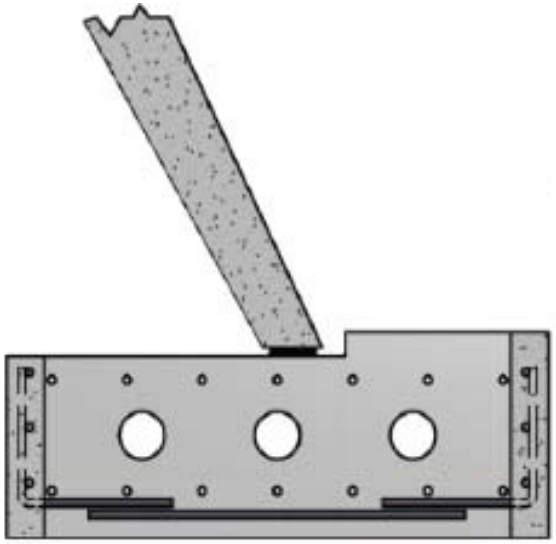
Benefits to You:

- Provides ease and speed of installation
- Alleviates hazardous working conditions
- Trapezoidal foundation reduces wingwall concrete quantities
- Minimal reinforcement to be placed on site
- Pick weights and sizes customized to your equipment



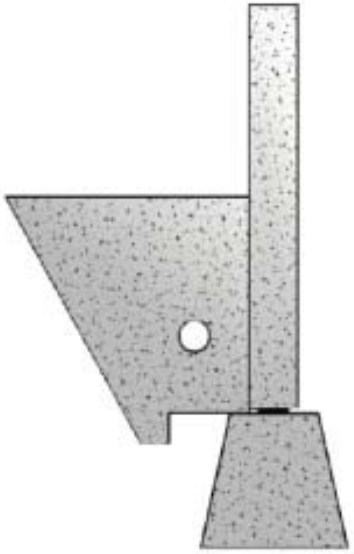
CONTECH ENGINEERED SOLUTIONS

EXPRESS™ Foundations



Example: 6'x2' foundation

- *27% Precast*
- *73% Poured in place concrete*



Cross section of wingwall foundation (***20% material savings versus rectangular foundation***)

CONTECH ENGINEERED SOLUTIONS

EXPRESS™ Foundations

Construction Process:

- Excavate and prepare foundation subgrade
- Unload and set precast channels
- Place minimal reinforcing at joints to provide foundation continuity
- Set precast bridge units, headwalls and wingwalls
- Pour cast-in-place concrete
- Seal joints, grout wingwalls and backfill.

CONTECH
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Frenchtown Brook Bridge Replacement
East Greenwich, Rhode Island

CONTECH
ENGINEERED SOLUTIONS

Frenchtown Brook Bridge Replacement
East Greenwich, Rhode Island

Innovation #4:

Thru Truss

U.S. Bridge Thru Truss – 300’ Span

27’

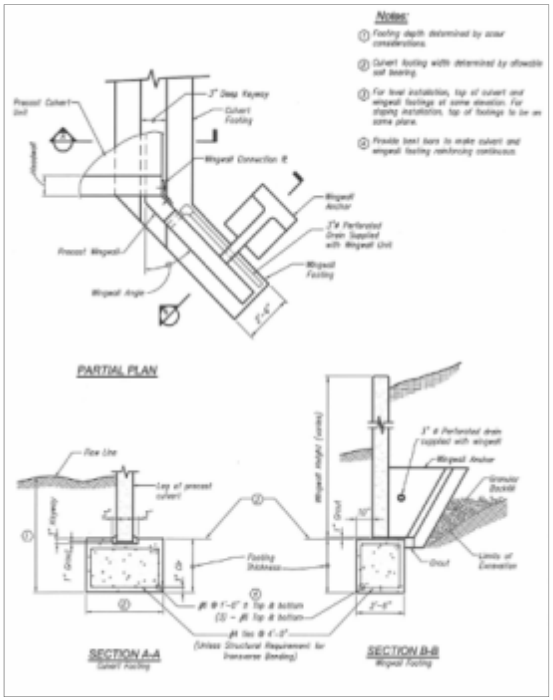
- All Bolted connections for ease of installation, inspection and maintenance
- Galvanized finish w/ 35-year warranty for extended life spans
- On site erection support expertise & assistance by manufacturing representative for ease of installation & quality assurance
- Pre Engineered and Pre Fabricated for lower design and installation costs
- Industry leader with 15,000 installations since 1936
- Clear spans up to 300’ for environmentally sensitive sites

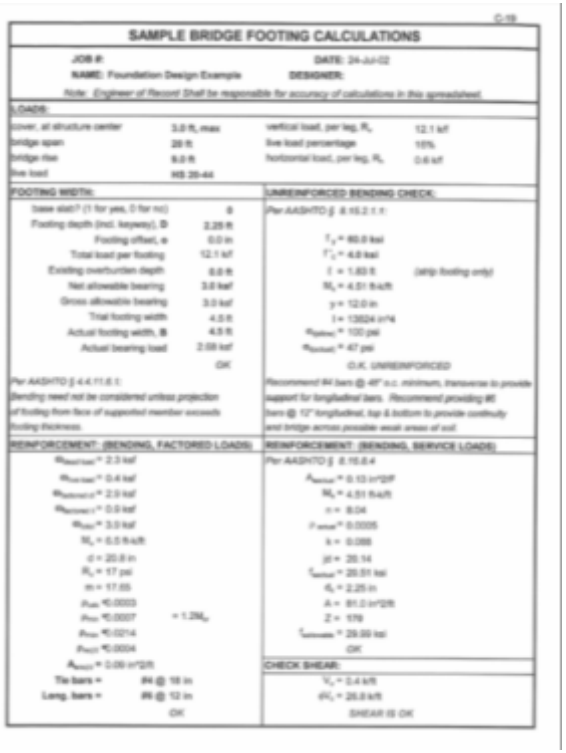
CONTECH ENGINEERED SOLUTIONS

Building Blocks to a Successful Project

Solution Development | **Design Support** | Installation

- Horizontal and vertical reactions
- Foundation sizing
- Foundation design calculations
- Foundation drawings





SAMPLE BRIDGE FOOTING CALCULATIONS

JOB #:
DATE: 24-Jul-02
NAME: Foundation Design Example
DESIGNER:

Note: Engineer of Record Shall be responsible for accuracy of calculations in this spreadsheet.

LOADS:

cover...at structure center	3.0 ft, max	vertical load, per leg, R_v	12.1 k/f
bridge span	20 ft	live load percentage	15%
bridge rise	6.0 ft	horizontal load, per leg, R_h	0.6 k/f
live load	HS 20-44		

FOOTING WIDTH:

base slab? (1 for yes, 0 for no)	0		
Footing depth (incl. keyway), D	2.29 ft		
Footing offset, e	0.0 in		
Total load per footing	12.1 k/f		
Existing overburden depth	0.0 ft		
Net allowable bearing	3.0 ksf		
Gross allowable bearing	3.0 ksf		
Trial footing width	4.5 ft		
Actual footing width, B	4.5 ft		
Actual bearing load	2.69 ksf		
	OK		

Per AASHTO [] 4.4.11.6.1:
Bending need not be considered unless projection of footing from face of supported member exceeds footing thickness

UNREINFORCED BENDING CHECK:

Per AASHTO [] 8.15.2.1.1:

f'_c = 40.0 ksi
f'_{ci} = 4.8 ksi
l = 1.83 ft (strip footing only)
M_s = 4.51 ft-k/ft
y = 12.0 in
I = 13824 in^4
$\phi_{flexure}$ = 100 psi
$\phi_{tension}$ = 47 psi

O.K. UNREINFORCED

Recommend #4 bars @ 48" o.c. minimum, transverse to provide support for longitudinal bars. Recommend providing #6 bars @ 12" longitudinal, top & bottom to provide continuity and bridge across possible weak areas of soil.

REINFORCEMENT: (BENDING, FACTORED LOADS):

$\phi_{flexure}$ = 2.3 ksf
$\phi_{flexure}$ = 0.4 ksf
$\phi_{flexure}$ = 2.3 ksf
$\phi_{flexure}$ = 0.0 ksf
ϕ_{flex} = 3.0 ksf
M_u = 6.5 ft-k/ft
d = 20.8 in
R_u = 17 psi
m = 17.65
ρ_{req} = 0.0003
ρ_{min} = 0.0007 = 1.2ρ_b
ρ_{max} = 0.0214
ρ_{bal} = 0.0004
$A_{s,req}$ = 0.09 in^2/ft
Tie bars = #4 @ 18 in
Long. bars = #4 @ 12 in
OK

REINFORCEMENT: (BENDING, SERVICE LOADS):

Per AASHTO [] 8.15.8.4

$A_{s,service}$ = 0.13 in^2/ft
M_s = 4.51 ft-k/ft
n = 8.04
$r_{service}$ = 0.0035
k = 0.088
jd = 20.14
$f_{s,service}$ = 20.51 ksi
f_s = 2.25 in
A = 81.0 in^2/ft
Z = 178
$f_{s,allowable}$ = 29.00 ksi
OK

CHECK SHEAR:

V_u = 0.4 k/ft
ϕV_c = 26.8 k/ft
SHEAR IS OK

CONTECH ENGINEERED SOLUTIONS

CONTECH STRUCTURAL PLATE | CON SPAN BRIDGE SYSTEMS | BEBO Arch Systems | CONTINENTAL BRIDGE | EXPRESS | U.S. BRIDGE

A new generation of innovation…

1 CON SPAN. -SERIES

2 BridgeCor™

3 EXPRESS™ Foundations

4 U.S. BRIDGE® BRIDGING AMERICA SINCE 1936 Thru Truss

CONTECH ENGINEERED SOLUTIONS

Industry Trends

A. Buried Bridges
   - Buried Bridge vs. Conventional Bridge
   - Buried Bridge vs. Culvert

B. Environmental, Clear-spanning & Permitting

C. Accelerated Bridge Program

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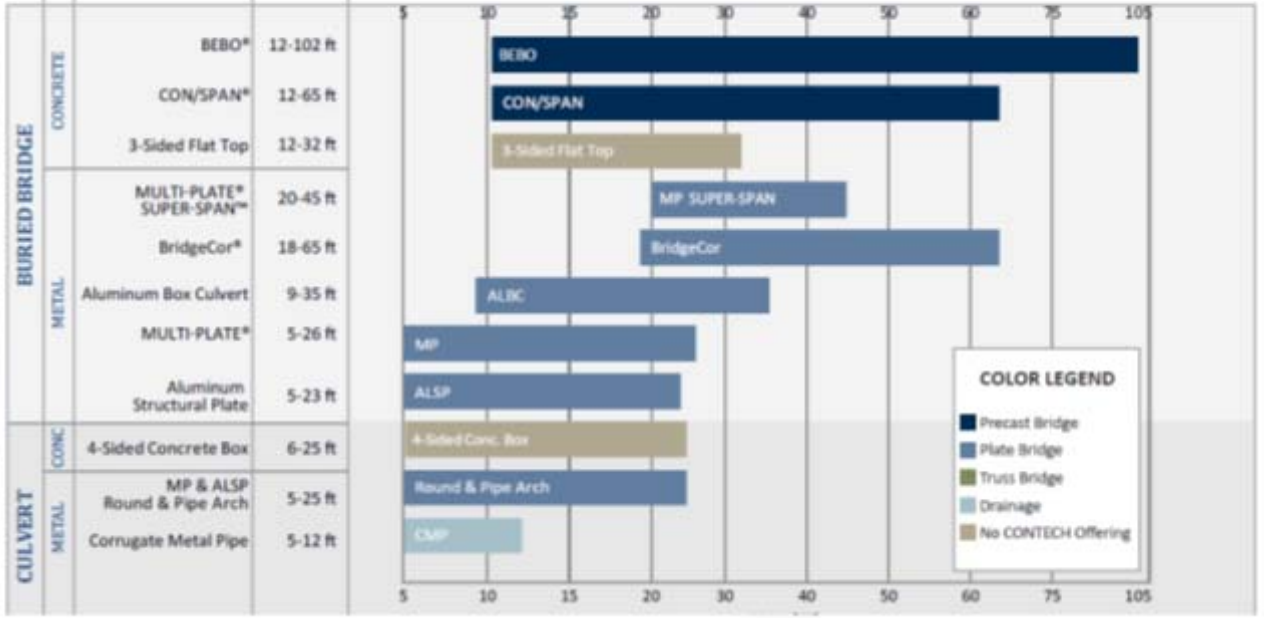
ENGINEERED SOLUTIONS

Bridge Type Selection Chart



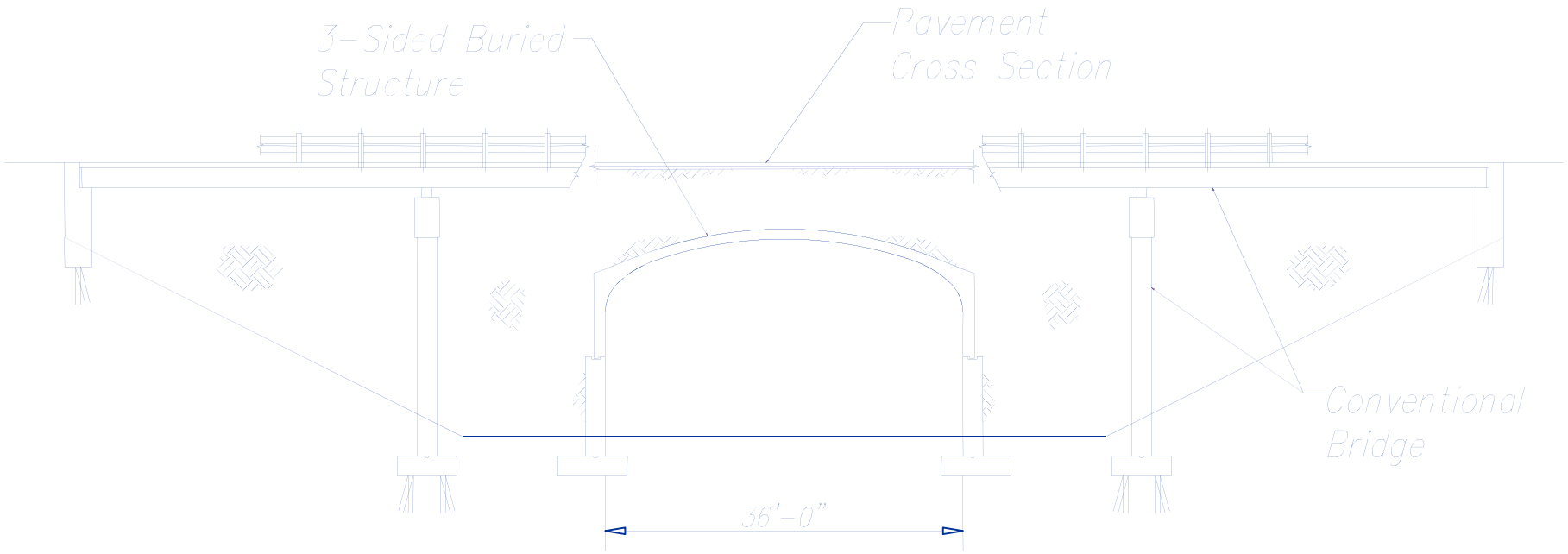



		PRODUCTS	SPAN
CONVENTIONAL BRIDGE	STEEL	Steel Plate Girder	80-300 ft
		Pedestrian Truss	20-300 ft
		Vehicular Truss	50-300 ft
		Rolled Beam Bridge	20-120 ft
	CONCRETE	Precast I/T Beams	40-125 ft
		Precast Box Beam	20-90 ft
BURIED BRIDGE	CONCRETE	BEBO®	12-102 ft
		CON/SPAN®	12-65 ft
		3-Sided Flat Top	12-32 ft
	METAL	MULTI-PLATE® SUPER-SPAN™	20-45 ft
		BridgeCor®	18-65 ft
		Aluminum Box Culvert	9-35 ft
		MULTI-PLATE®	5-26 ft
		Aluminum Structural Plate	5-23 ft
CULVERT	CONC.	4-Sided Concrete Box	6-25 ft
	METAL	MP & ALSP Round & Pipe Arch	5-25 ft
		Corrugate Metal Pipe	5-12 ft



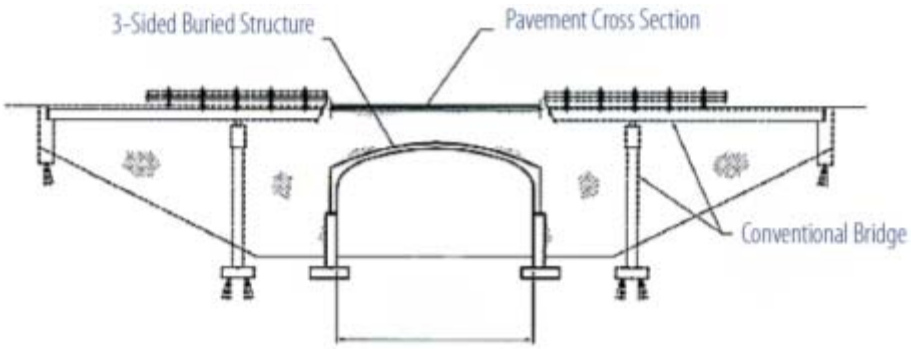
CONTECH ENGINEERED SOLUTIONS

Buried Bridge vs. Conventional Bridge



CONTECH ENGINEERED SOLUTIONS

Buried Bridge vs. Conventional Bridge



CONVENTIONAL BRIDGES CONVERT TO BURIED BRIDGES:

- Shorter construction time/phasing means lower initial cost
- Minimal/no long term maintenance lowers overall life cycle cost
- Shorter construction time minimizes traffic disruption
- Bury utilities in backfill over structure
- Increased safety with limited/no freeze concerns & deck maintenance

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Buried Bridge vs. Conventional Bridge

Before

After

During

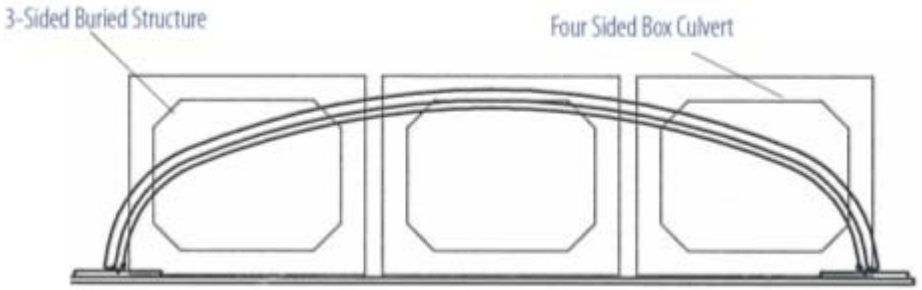
Bridge Type Comparison Chart

	CONVENTIONAL	BURIED
Traffic Disruption*	2 YEARS	5 MONTHS
Construction Time*	2 YEARS	1 YEAR
Initial Cost*	$8 M	$5.5 M
Typical Maintenance*	Deck Overlay every 15–18 years. Total Deck Replacement every 30-35 years.	Periodic Asphalt replacement.

*Estimated

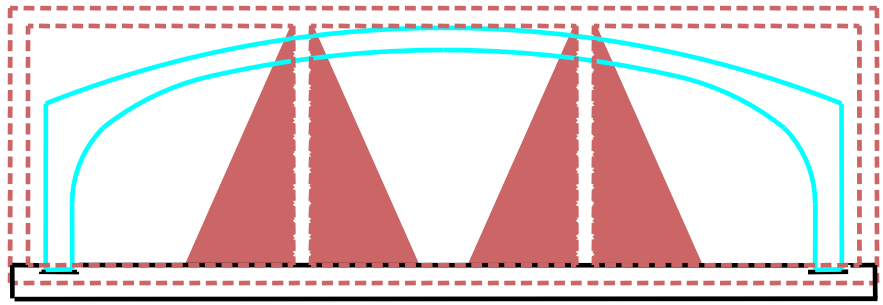
CONTECH ENGINEERED SOLUTIONS

Buried Bridge vs. Culverts



CULVERTS CONVERT TO BURIED BRIDGES

- Complete system with headwalls, wingwalls and foundations
- Bottomless structure promotes natural aquatic habitat and fish/wildlife passage
- Maintenance-free structure lowers overall life cycle cost
- Project specific design to handle all loading requirements
- Long clear spans promote improved hydraulics while minimizing pier blockage



B. Environmental, Clear-spanning & Permitting

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C. Accelerated Bridge Program

U.S. Department of Transportation
Federal Highway Administration

CONTECH ENGINEERED SOLUTIONS

Accelerated Bridge Program

U.S. Department of Transportation
Federal Highway Administration

***Accelerated Bridge Construction (ABC)*:**

- ABC is bridge construction that uses innovative planning, design, materials, and construction methods in a safe and cost-effective manner to reduce the onsite construction time that occurs when building new bridges or replacing and rehabilitating existing bridges

Prefabricated Bridge Elements and Systems

- PBES are structural components of a bridge that are built offsite, or near-site of a bridge and include features that reduce the onsite construction time and the mobility impact time that occurs when building new bridges or rehabilitating or replacing existing bridges relative to conventional construction methods.

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Connection Details for Prefabricated Bridge Elements and Systems

March 30, 2009

Publication No. FHWA-IF-09-010

U.S.Department of Transportation
Federal Highway Administration

Priority, Market Ready Technologies and Innovations

HIGHWAYS FOR LIFE
Accelerating Innovation for the American Driving Experience

Figure 2.4.3-1 depicts a proprietary arch system call the Con/Span® Bridge System. This system, including the arch elements, the spandrel walls, the wingwalls and the footings, can be completely made with precast concrete elements. The connections shown in Figure 2.4.3-1 are described in the following sections.

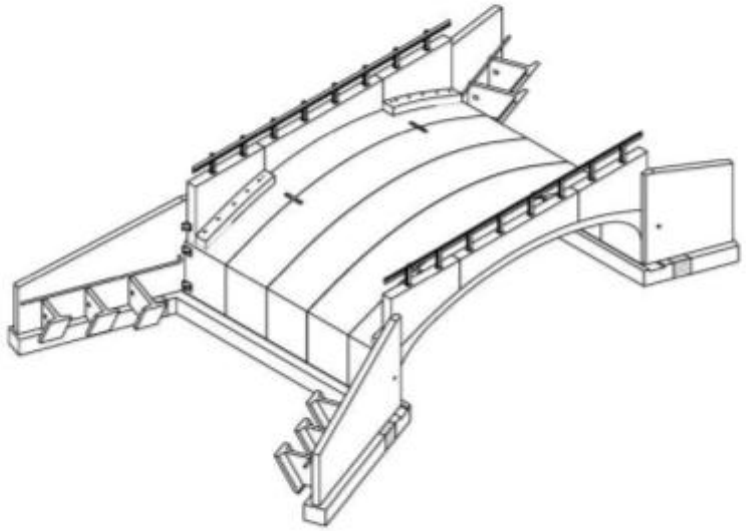

Figure 2.4.3-1 Con/Span® Bridge System

Page 2-181

"Prefabricated elements of a bridge produced off-site can be assembled quickly, and can reduce design time and cost, minimize forming, minimize lane closure time and/or possibly eliminate the need for a temporary bridge."

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Local Project Examples

Buried Structures vs. Conventional Bridges

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SR 0072-28

- 16’ x 10’ x 128 LF
- “Reline” existing triple span beam bridge
- Base slab utilized for ped. and vehicular use
- 120 LF of precast Wingwalls
- Constructed while existing structure handled traffic


2010/12/09


2010/12/13

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SR 0081 Section 255

Luzerne County, Pennsylvania

McTish Kunkel

www.ContechES.com

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Luzerne County, Pennsylvania

McTish Kunkel

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Local Project Examples

Accelerated Bridge Construction

CONTECH ENGINEERED SOLUTIONS

SEPTA R5 – Design Challenges:

- Obtain 24’ x 12’ Clearance Box
- Commuter Service Out for Less than Four Days
- Design for AREMA E-80 Railroad Loading

Solution Development

- ✓ Project Design Worksheet
- ✓ Structure Selection
- ✓ Siting & Layout
- ✓ Engineer Estimate
- ✓ Site Simulation

Design Support

- ✓ Specifications
- ✓ Contract Drawings
- ✓ Structural/Fabrication Drawings
- ✓ Custom Shape Development
- ✓ Horizontal/Vertical Alignment
- ✓ Foundations

Installation

- ✓ Preconstruction Meeting
- ✓ On-Site Installation Assistance
- ✓ Logistics Coordination


JLG ULTRA BOOM

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SEPTA R5 Doylestown

Bucks County, Pennsylvania

SEPTA

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STRUCTURAL PLATE

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CONTECH® STRUCTURAL PLATE

Jonathan Run Culvert Reline
Ohiopyle State Park, PA

DCNR

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Hebron Township Bridge Replacement
Potter Co., PA

GeoTech Engineering

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U.S. BRIDGE
BRIDGING AMERICA SINCE 1936

Fox Stop Rd. Bridge
Fallowfield Twp. Washington Co., PA

Mackin Engineering

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CONTECH ENGINEERED SOLUTIONS

Contech. Your project partner.

- Summary & Overview Bridge Portfolio
- Innovative Bridge Developments
- Engineering Support & Design Tools
- Contech's Consultative Approach

Building Blocks to a successful Project

Planning & Solution Development

- Project Design Worksheet
- Structure Selection
- Siting & Layout
- DYOB
- Engineer Estimate
- Site Simulation
- Proposal Preparation
- Design Build Support

Design Support

- Specifications
- Contract Drawings
- Permitting
- Structural/Fabrication Drawings
- Approval Assistance
- Custom Shape Development
- Horizontal/Vertical Alignment
- Hydraulics & Scour Support
- Foundations

Installation Support

- Preconstruction Meeting
- On-Site Installation Assistance
- Logistics Coordination

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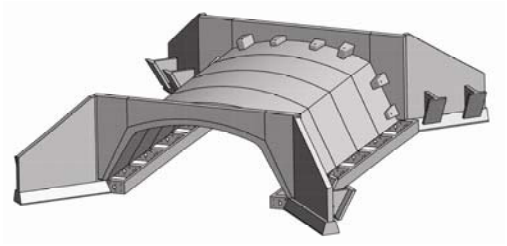
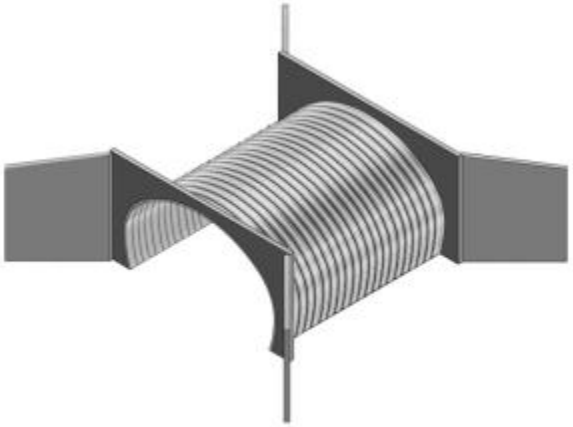
Questions?

CON SPAN O-SERIES



BridgeCor™



EXPRESS™ Foundations