

## Bridge Structures



# Spanning America Since 1931

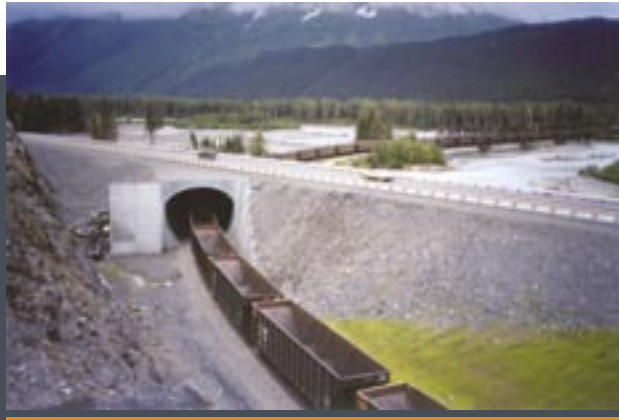
CONTECH® CONSTRUCTION PRODUCTS INC. has been providing cost effective bridge solutions on D.O.T., residential, commercial and industrial, forestry and flood control sites since the first MULTI-PLATE® structure was installed in 1931. One of our earliest bridges, installed in New Jersey in 1938, has been nominated for placement on the National Register. This twin span, galvanized corrugated steel arch bridge with rustic stone-in-concrete headwalls is typical of CONTECH's MULTI-PLATE arch bridge durability and value.

Since that time CONTECH has continued to add new bridge products to our bridge offering in order to meet the growing demand for new and replacement bridges in the market place. Today, CONTECH's potent bridge offering includes steel and aluminum structural plate bridges, vehicular and pedestrian steel truss bridges and the newest addition, concrete arch system bridges.

No matter the design requirement, CONTECH has become the single contact for every bridge need. Wide spans, long service lives, aesthetic architectural centerpiece, a low budget, CONTECH has the solution.

## Steel and Aluminum Structural Plate

CONTECH's numerous steel and aluminum pre-engineered bridge structures are not only used to cross streams and wetlands. They are also specified as underpasses, tunnels, grade separations, large culverts, and stream enclosures. The designer can choose from a wide variety of shapes and sizes for a given application – which allows the engineering solution at the most economical price. This versatility gives engineers numerous methods of construction, removing all size, shape and installation restrictions of cast-in-place concrete.



Railroad underpass SUPER-SPAN 28'-1" x 27'-9" with Bin-Wall™ Headwalls. Seaward Highway. Alaska, built 1975 extended in 2000.

## Vehicular and Pedestrian Bridges

CONTECH added Steadfast® and Continental® Bridge Companies in 2000. Both companies offer fully engineered pedestrian bridge crossings up to 400 feet clear spans. In addition, the Steadfast Bridge Company offers several styles of two lane pre-engineered

vehicular bridges with clear spans up to 150 feet. These bridge solutions are perfect for bridge crossings where low headroom and large hydraulic capacity is required or where aesthetics are important.

## Precast Concrete Arch System Bridges

The BEBO® Concrete Arch System was added to CONTECH's bridge offering in May of 2003. With spans of 12 feet to over 84 feet, the BEBO Concrete Arch System is one of the largest precast concrete arch systems in the world and has been manufactured and installed for more than 20 years in the US and for over 40 years in Europe. The BEBO Concrete Arch System is a combination of precast arch elements, spandrels, wingwalls and cast-in-place concrete footings creating over 100 different sizes and producing waterway areas exceeding 2000 square feet in a single span.

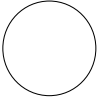
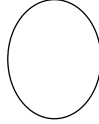
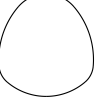






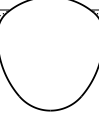





Any CONTECH bridge solution can utilize Keystone® retaining wall systems as headwalls or abutment walls to create an economical and attractive structure for those centerpiece projects.

## The One Stop Bridge Shop

A CONTECH bridge solution will provide a lower in-place cost than traditional bridge construction. This coupled with the fact that these solutions are all available from your local CONTECH Sales Engineer means that you have only one number to call to get the **best** bridge solution in the industry.

When you think of bridges, think of CONTECH.

# CONTECH Total Bridge Offering

STRUCTURE SHAPE GEOMETRY							
Shapes		Sizes — Span x Rise	Common Uses	Concrete	Steel	Aluminum	Trade Name
Round		5' to 26'	Culverts, storm sewers, aggregate, vehicular and pedestrian tunnels, and stream enclosures. Functions well in all applications, but especially in those with higher cover.		X	X	MULTI-PLATE Aluminum Structural Plate
Vertical Ellipse		4'8" x 5'2" to 25' x 27'7"	Culverts, storm sewers, service tunnels, recovery tunnels and stream enclosures. Works well in higher cover applications.		X	X	MULTI-PLATE Aluminum Structural Plate
Underpass		12'2" x 11'0" to 20'4" to 17'9"	Offers efficient shape for passage of pedestrians or livestock, vehicular traffic and bicycles with minimal invert bury.		X	X	MULTI-PLATE Aluminum Structural Plate
Pipe-Arch		6'1" x 4'7" to 20'7" x 13'2"	Limited headroom. Has hydraulic advantages at low flow levels. Culverts, storm sewer, underpass and stream enclosures.		X	X	MULTI-PLATE Aluminum Structural Plate
Horizontal Ellipse		7'4" x 5'6" to 14'11" x 11'2"	Culverts, bridges, low cover applications, wide centered flow, good choice when poor foundations are encountered		X	X	MULTI-PLATE Aluminum Structural Plate
Arch (single radius)		5' x 1'9" to 25' x 12'6"	Low clearance, large waterway opening. Aesthetic shapes and open natural bottoms for environmentally friendly crossings.		X	X	MULTI-PLATE Aluminum Structural Plate
Low-Profile Arch *		20'1" x 7'6" to 45'0" x 18'8"	Culverts, storm sewers, low headroom and large opening. Bridge structures, stream enclosures. Aesthetic shapes and open natural bottoms for environmentally friendly crossings.		X	X	SUPER-SPAN SUPER-PLATE
High-Profile Arch *		20'1" x 9'1" to 35'4" x 20'0"	Culverts, storm sewers, bridges. Higher rise, large area opening. Open natural bottoms for environmentally friendly crossings.		X	X	SUPER-SPAN SUPER-PLATE
Pear-Arch		23'-11" x 23'-4" to 30'-4" x 25'-10"	Railroad underpasses or large clearance areas.		X		SUPER-SPAN
Pear		23'-8" x 25'-5" to 29'-11" x 31'-3"	Railroad underpasses or large clearance areas.		X		SUPER-SPAN
Horizontal Ellipse		19'4" x 12'9" to 37'2" x 22'2"	Larger culverts and bridges. Low headroom wide centered flow, good choice when poor foundations are encountered.		X	X	SUPER-SPAN SUPER-PLATE
Box Culvert		8'9" x 2'6" to 35'-3" x 13'-7"	Very low, wide bridges, culverts, and stream enclosures functions well as fast small-span bridge replacement.			X	Aluminum Box Culvert
Pedestrian		spans up to 400'	Recreational, overpasses, industrial conveyor, pipe support		X		STEADFAST/ CONTINENTAL
Vehicular		spans up to 150'	County, city, parks, industrial complexes.		X		STEADFAST
Elliptical/ Circular Arch		12' x 3'-6" to 84' x 29'10"	Culverts, bridges, tunnels, wetlands crossings, overpass/underpass, underground containment, wine/cheese cellars, shelters	X			BEBO

\* Larger steel sizes are available up through 50 ft. spans. Call your local Sales Engineer for more information.

# Bridge Structures

## Over 3000 SUPER-SPANS in Place

Since 1967, more than 3,000 structures have been built on five continents. That makes SUPER-SPAN the most widely accepted long-span, corrugated steel design in the world.

SUPER-SPAN™ structures with individual spans up to 50 feet are serving as bridges, railroad underpasses, stream enclosures, vehicular tunnels, culverts and conveyor conduits. Installations have involved almost every job condition possible, including severe weather and unusual construction time constraints.

### National specification

SUPER-SPAN's popularity has resulted in a national specification written for long-span, corrugated metal structures by the American Association of State Highway and Transportation Officials. AASHTO Standard Specifications (Section 12.7) for Highway Bridges provide for the selection of acceptable combinations of plate thickness, minimum cover requirements, plate radius and other design factors. Material is covered by AASHTO M 167 AND ASTM A 761. Installation is covered by AASHTO standard specification for highway bridges (Sec. 12) and ASTM A 761.

### Acceptance

Many state and federal agencies recognize the excellent performance and economy of SUPER-SPAN corrugated structures. In a 1979 memorandum, the chief of FHWA's Bridge Division noted that in the previous 15 years several hundred CONTECH SUPER-SPAN Culverts had been erected in the United States and Canada and their performance had been excellent.

In a 1983 report to the Secretary of Transportation, the General Accounting Office stated, "Some innovations, such as using certain long-span culverts rather than building conventional bridges, have substantially lowered bridge costs."

### Aluminum long-span structures (SUPER-PLATE)

SUPER-PLATE® structures add both longitudinal stiffeners (thrust beams) and circumferential stiffeners (reinforcing ribs) to conventional aluminum structural plate to achieve larger sizes. Clear spans in excess of 30 feet and clear areas over 435 square feet are achievable with SUPER-PLATE. Available shapes include low- and high-profile arch and horizontal ellipse. Consult a CONTECH Sales Engineer for additional information.



High-profile arch SUPER-SPAN (46'-5" span, 27' rise) in Hamilton, Ohio to span a wetland and to provide a wildlife crossing.

# CONTECH SUPER-SPAN/SUPER-PLATE Applications



- Wetland Crossings
- Pedestrian Underpasses
- Stream Crossings
- Multi-Span Bridges
- Vehicular Underpasses
- Railroad Underpasses
- Grade Separation
- Stormwater Management



# The Solution for Small Bridge Replacement: Aluminum Box Culverts

CONTECH Aluminum Box Culverts are a practical and cost-efficient solution for small bridge replacement. They have a lower installed cost because they are faster and easier to install than cast-in-place concrete structures. There are no forms to set and remove, no delays due to curing time, large installation crews are unnecessary and no special equipment is needed. Also, no heavy cranes are required to lift lightweight aluminum box culverts.

These wide-span, low-rise structures are available in a large range of standard sizes (from 8'-9" span x 2'-6" rise to 25'-5" span x 10'-2" rise) that permit a minimum cover of only 17 inches for all spans, handling HS20 or HS25 live loads.

## Faster Installation Means Lower Installed Cost

Closing roads for bridge replacement causes extensive traffic detours, so minimizing installation time is critical. Aluminum Box Culverts may be quickly erected in place and are usually ready to be backfilled in a matter of hours. For faster installation, Aluminum Box Culverts can be completely assembled nearby while the site is being prepared. Light equipment can then be used to set them in place.

### National Specification

CONTECH Aluminum Box Culvert design and installation is covered by AASHTO Standard Specifications for Highway Bridges (Sec 12.8). The material is covered by AASHTO M 219 and ASTM B 864.



County road bridge replacement made easy with lightweight, pre-engineered aluminum box culverts.



# CONTECH Aluminum Box Culvert Applications



Skewed Bridge Alignment  
Golf Cart Underpasses  
Bridges  
Stream Crossings



# MULTI-PLATE

## Made to Perform, Built to Last

CONTECH MULTI-PLATE structures provide designers of underpasses, bridges and stormwater management systems with a versatile method of construction and a long history of strength, durability and economy. A variety of shapes and sizes ensures that MULTI-PLATE structures fit most applications. Ease of design, construction and proven reliability make them the frequent choice of experienced engineers.

MULTI-PLATE structures, made from sturdy, heavy gauge corrugated steel plates, are pre-formed to various shapes and sizes, then hot-dip galvanized for long-term protection and performance. The plates are delivered to the job site and bolted together to form a structure optimally suited for the project.

MULTI-PLATE is available in full round, arch, pipe-arch, horizontal and vertical ellipse, underpass, and long-span shapes—all in a wide range of sizes. Since 1931, MULTI-PLATE has been proven to offer ...

### **Proven durability**

MULTI-PLATE's heavy gauge steel uses the industry standard 3 oz. per square foot galvanized coating capable of providing a service life of 75 years or longer.

### **High-load carrying capacity**

As a steel-soil interaction system, MULTI-PLATE is designed to carry high combined live and dead loads. High traffic loads and deep cover applications are perfect for MULTI-PLATE structures.

### **Easier, faster installation**

Prefabricated plates are assembled in the field, which means construction is completed in days instead of the weeks that a concrete structure usually requires.

### **Versatility**

Shape, size and installation restrictions are removed with MULTI-PLATE structures.

### **National Specification**

CONTECH MULTI-PLATE design is covered by AASHTO Standard Specifications for Highway Bridges (Sec. 12) and ASTM A 796. Material is covered by AASHTO M 167 and ASTM A 761. Installation is covered by AASHTO Standard Specifications for Highway Bridges (Sec. 26) and ASTM A 807.

Ease of design, construction and proven reliability make MULTI-PLATE the frequent choice of experienced engineers.





# CONTECH MULTI-PLATE Applications



- Bridges
- Stream Enclosures
- Golf Cart Underpasses
- High-Fill Covers
- Pedestrian Underpasses
- Aggregate Tunnels



# Aluminum Structural Plate: Light Weight Means Lower Installed Cost

CONTECH Aluminum Structural Plate gives you all the advantages of steel MULTI-PLATE, plus the light weight, which adds to the ease of installation when compared to traditional concrete structures.

Aluminum structural plate weighs 1/50 as much as reinforced concrete pipe in an equivalent size. This weight factor reduces assembly and equipment costs, helps gain access to remote sites and allows easy handling of long, preassembled structures.

## Lower job site unloading costs

Lightweight plates and reinforcing ribs arrive at the job site in strapped and nested bundles. Individual plates and ribs are generally light enough to be handled by one worker. Bundles can be handled with light-duty lifting equipment.

## Lower job site assembly costs

Most structures contain plate and rib sizes that can be assembled without lifting equipment. As a quality assurance measure, at least one ring of plates for each order is plant-assembled and checked prior to shipment.

Aluminum Structural Plate can be manufactured into large sections with up to three different radii in the same plate. This reduces the number of joint connections, lowering assembly costs. Off-site assembly is an added feature of lightweight aluminum, with obvious cost-saving benefits.

Typical Aluminum Structural Plate applications include small bridges, grade separations, underpasses, culverts, stream enclosures, storm sewers and rehabilitating existing structures through relining.



The light weight factor reduces assembly and equipment costs

## National Specification

CONTECH's Aluminum Structural Plate design meets or exceeds AASHTO Standard Specifications for Highway Bridges (Sec. 12.6) and ASTM B 790. Material meets or exceeds AASHTO M 219 or ASTM B 746. Installation is covered by AASHTO Standard Specifications for Highway Bridges (Sec. 26.5) and ASTM B 789.

# CONTECH Aluminum Structural Plate Applications



Bridges  
Reline  
Railroad Overpasses  
Culverts



# Designing for Durability: Steel or Aluminum?

## Contemporary Standards

As the country's infrastructure ages, many DOT's, municipalities and counties have raised their expectations of service life for new or replacement structures. It is common to see a requirement for 50, 75 or 100 years of service life to help lessen future maintenance burdens. Designing for durability has become an integral part of contemporary design philosophy.

As an engineer-driven firm, CONTECH has been on the inside of durability considerations from the inception. We provide both steel and aluminum products to meet these service lives based on the environment. As with all material, the environment in which the structure is used is a critical design aspect. SUPER-SPAN, SUPER-PLATE, Aluminum Box Culverts, Aluminum Structural Plate and MULTI-PLATE have decades of documented use in a wide range of environments. Therefore, we can confidently predict the service life of hot-dip galvanized and aluminum structural plate products in a given environment.

### Service Life Projection Guidelines: CONTECH Steel MULTI-PLATE and SUPER-SPAN

MULTI-PLATE structures were developed over 65 years ago as a reliable and durable means of constructing small bridges and underpasses, large culverts and other drainage systems.

MULTI-PLATE and SUPER-SPAN service lives can be reliably predicted when site pH, resistivity, and abrasion potential have been identified. The American Iron and Steel Institute (AISI) design chart (below) uses the pH and resistivities of soils and water to predict effective service life based on historical data.

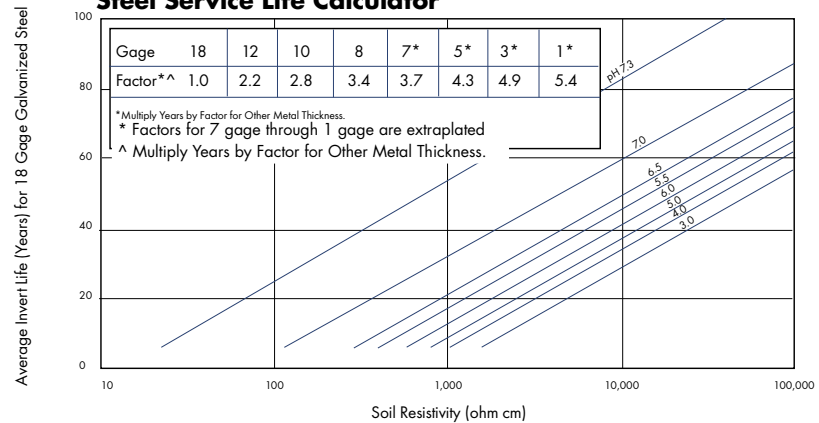
Thousands of successful projects have proven the AISI procedure an accurate method to determine the life of steel such as MULTI-PLATE. Other methods, such as that prepared by the California Department of Transportation or FHWA, are also applicable. Your CONTECH representative can provide complete copies of these guidelines.

Installed in California, 1946  
Photo taken in 1998

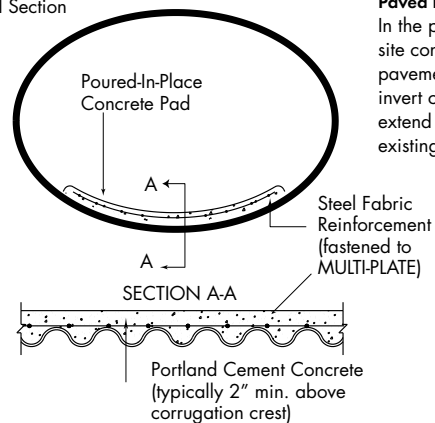


When severe conditions warrant, added protection can be easily provided to assure long-term serviceability. Asphalt coatings, concrete paved inverts, thicker gauge invert plates or arch structures with natural stream beds may be utilized to counter aggressive runoff or heavy abrasion.

### Steel Service Life Calculator



Typical Section



### Paved Inverts

In the presence of aggressive site conditions, concrete pavement in the structure invert can cost-effectively extend the life of new or existing structures.

## CONTECH Aluminum Structural Plate, Box Culverts and SUPER-PLATE

The corrosion resistance of CONTECH Aluminum Structural Plate is due to a tenacious, inert oxide barrier that forms on the metal surface when exposed to air. If damaged or affected by an aggressive environment, the oxide barrier reforms, in effect, healing itself. The oxide appears on the structure surface as a grayish-white coating that builds up over time.

### 75-year minimum service life

Based upon performance and ongoing inspection of aluminum plate structures first installed in 1959, a **minimum service life of 75 years** can be predicted for .100"-thick aluminum structural plate (pH between 4.0 and 9.0 and resistivity > 500 ohm-cm). In addition, good performance can be expected in seawater environments when the structure is backfilled with a clean, free draining, granular material.



These triple 11'-5" x 7'-1" aluminum structural plate pipe-arches were installed in Ft. Myers, FL in 1968. An inspection in 1997 showed staining at the waterline that was easily removed, revealing shiny aluminum. These structures are performing like new.



This 180" vertical ellipse Aluminum Structural Plate pipe has handled tidal ocean waters under U.S. Highway 1 at the Bay of Fundy in Maine since 1966. A July 2000 inspection shows the structure continuing to perform well after 34 years of exposure to a harsh environment. Maine DOT last rated this structure an 8 out of 9, citing only discolorations of the surface and some minor pitting.

# BEBO Concrete Arch System

The pre-engineered BEBO Concrete Arch System is a combination of cast-in-place concrete footings, precast arch elements, spandrel and wingwalls. Developed in 1966 in Switzerland, the Bebo Concrete Arch System is the optimized concrete version of what the Romans built in 800BC and uses the proven theory of soil-structure interaction to achieve superior strength and stability.

## The Largest Precast Arch Span in the World

BEBOTech, a CONTECH Company, produces the largest precast clear spans in the world. With a span range of 12 feet to 84 feet creating over 100 standard BEBO Concrete Arch sizes resulting in clear areas over 2000 square feet, chances are there is a BEBO shape perfect for any application.

The BEBO Concrete Arch System is available in 12 feet to 48 feet in the single-leaf arch element and in 54 feet to 84 feet in the patented twin leaf element. In addition the E series (Elliptical) are wider and lower rise shapes and the C series (Circular) are more high profile shapes used in high cover applications.

## No Maintenance

Besides the long maintenance free service life of concrete structures the BEBO Concrete Arch System is a soil-concrete interaction system, where part of its strength is derived from the soil-envelope around the structure. This eliminates the conventional concrete bridge deck maintenance headaches. No decks to repair or any beams to paint. The natural soil deck of the BEBO Concrete Arch System also reduces the risk of potentially hazardous icing on the roadway surface.

## Environmentally Friendly

The natural shape of the Bebo Concrete Arch produces large open bottoms that can span wetland and small streams with little or no impact to the river bed or surrounding environment. The BEBO Concrete Arch requires no large abutments and in most applications concrete spread footing can be utilized, thus reducing the potential for soil support systems that can have a large impact on the surrounding environment.



## Low Material and Installation Cost

The BEBO Concrete Arch System is very cost-effective for the following reasons:

- BEBO design requires less material than conventional bridge.
- Concrete elements can be installed quickly shaving weeks off construction schedules and road close time of conventional bridges.
- Little site work required to prepare for a BEBO Precast Concrete Arch System.
- Standard precast panels or Keystone modular block spandrel and wingwalls are utilized which speed construction and beautify the finished bridge.
- Requires no special pre-stressing or post-tensioning processes.
- Height of cover capabilities varies from a minimum of 1.5 feet to a maximum of 100 feet or more.

## A Fully Designed Bridge System

BEBOTech provides the following services on every BEBO Concrete Arch System supplied:

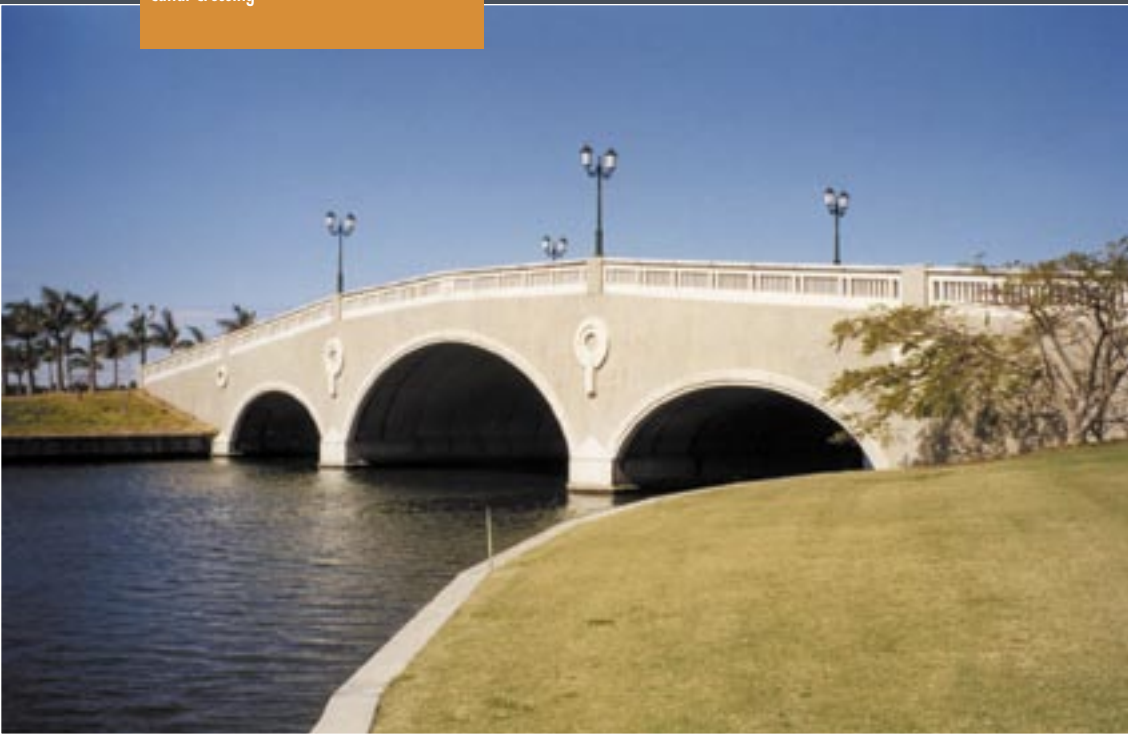
- BEBO Concrete Arch size selection based on project requirements.
- Professionally sealed structural calculations and design drawings on all arch elements, the mechanically stabilized earth geogrid designs for the spandrels and wingwalls and foundations.
- Hydraulic analysis for all BEBO Concrete Arch sizes.
- Full AutoCAD details on all components.
- Cost-Estimates.
- Installation and inspection assistance.
- Design assistance at every phase of the project!



# BEBO Arch Systems Applications



Canal Crossing



Causeway

# Vehicular Steel Bridges Tough and Durable



Steadfast Vehicular Steel Bridges clear-span up to 150 feet, reducing site preparation time and lowering costs. The reliable all-steel construction provides strength, safety and long-term durability.

## **Economical design solutions**

### **Long-spans eliminate piers**

Our Vehicular Steel Bridges allow a more economical design solution than other structures because of the high strength-to-weight ratio of steel and long, clear-spans that eliminate the need for costly piers. Custom-constructed to your specifications, our Vehicular Steel Bridge will meet skewed alignments, a roadway width of up to two lanes, AASHTO HS-20 demands or the heavier loads required by the mining industry.



## **Environmentally friendly**

Steadfast Vehicular Steel Bridges do not violate the environment they are spanning. They cross your waterway or wetlands without center piers that attract floating debris and decomposing vegetation.

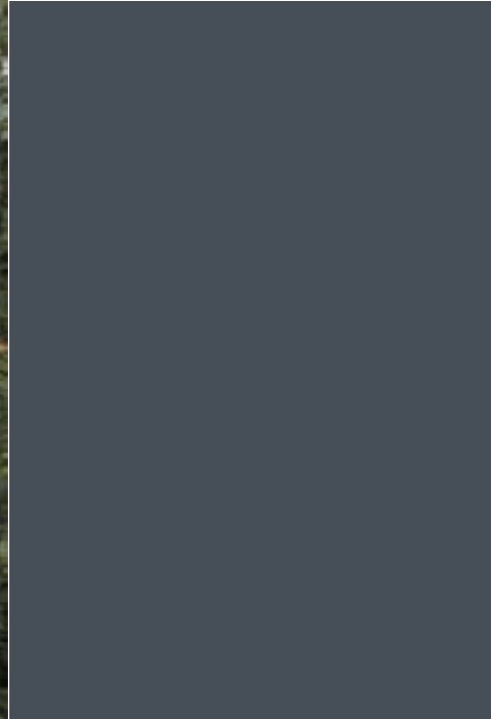
## **Built to your specifications**

Steadfast Vehicular Steel Bridges are built to your specifications using the best practices of the American Institute of Steel Construction, from which we hold our Major Bridge Certification.





# Pedestrian Bridges



CONTECH's Pedestrian Bridge Companies are the leading suppliers of bridges nationwide. Our prefabricated steel bridges are found in parks, on golf courses and wilderness trails, high above city streets connecting buildings and throughout industrial complexes. We are the leaders in recreational, specialty, industrial-conveyor and pipe-support bridges—as well as long-span pedestrian overpasses.

We serve engineers, architects and a variety of owners from all levels of government, plus, private individuals. We have on staff more degreed and registered structural engineers—who are licensed in 48 states—than many of our competitors combined.



# Bridge Rehabilitation

## Innovative products for economical rehabilitation and modernization

Bridge rehabilitation is frequently more economical and less disruptive than removal. This is also true of bridges requiring widening or other types of modernization. Most bridges can be relined by erecting CONTECH plate structures inside of them. Or, the new plate structure can be erected outside and threaded into existing openings. CONTECH's MULTI-PLATE, and Aluminum Structural Plate are delivered to the job site unassembled. The plates and ribs are easily bolted together to form various shapes: round, vertical and horizontal ellipse, pipe-arch, underpass and arch.

BEBO concrete arches provide another alternative for bridge rehabilitation. Precast elements are easily slid underneath existing aging structures to ensure their long-term serviceability.

### **MULTI-PLATE Pipe and Pipe-Arch**

MULTI-PLATE provides a larger range of sizes and shapes while retaining the advantages of corrugated metal pipe. Delivered to the job site unassembled, plates are bolted together to form a full round pipe, pipe-arch, ellipse, arch or other shape.

### **Aluminum Structural Plate**

These structures offer the advantages of steel plate plus the improved durability and lighter weight of aluminum. Aluminum Structural Plate lowers installation costs and resists corrosion, even in tough salt-water environments.



Most bridges can be relined by erecting CONTECH plate structures inside of them.



### **BEBO Concrete Arch**

Where the structure geometries allow, concrete arch elements provide another potent means for bridge rehabilitation.

# Rehabilitation Solutions

## Rehabilitation and Widening In Texas

Aluminum Box Culverts were installed as part of the rehabilitation and widening project. Voids between the Aluminum Box Culverts and the existing concrete bridge slabs and masonry walls were filled with a cement-stabilized backfill.



## New York DOT Project

A failing concrete arch structure was rehabilitated by threading with a CONTECH SUPER-SPAN arch. The void space between the SUPER-SPAN and the concrete arch was filled with concrete grout.



## Kansas DOT Rehabilitation

An aging reinforced concrete box culvert desperately needed rehabilitation. Fourteen foot round CONTECH liner plate structures were installed from within the existing box culvert with MULTI-PLATE extensions built onto the ends of the liner plate sections.

# Headwall Treatment Packages

There are a variety of headwall treatment packages available to correspond with the location of your CONTECH bridge, underpass or grade separation. For upscale housing developments and golf courses, we offer Keystone modular block packages in several styles to create a classic look.

For environments with a less demanding visual requirement and ambiance, we offer standard details and designs for cast-in-place concrete headwalls and wingwalls. Both straight and skewed structures are covered in these standards.

Bridge structures on county roads typically employ our standard aluminum headwall and wingwalls. This package provides a finished structure and helps prevent scouring and assists in flow channelization.

## **SUPER-SPAN Headwall and End Treatments**

SUPER-SPAN ends can be step-beveled with concrete slope collars, slope paving, etc. Square-end structures can use partial or full headwalls, wingwalls, steel BIN-WALLS and soil-reinforced headwalls.

Special cut ends, such as skews or severe bevels, may be used, but are not recommended. These designs must take into consideration the unbalanced loads acting on the structure ends. The use of reinforced concrete headwalls or other end-stiffening means are required.

For hydraulic structures, special attention should be given to the design of reinforcement of the metal edges at the inlet and outlet ends to secure them against hydraulic forces. They may require reinforced concrete or structural steel collars, tension tiebacks or anchors in the soil, partial headwalls or cut-off walls below the invert elevation to prevent scour.



## BEBO Pre-Engineered Solutions

For BEBO precast arch structures a full range of precast spandrels and wingwalls are available. Formliners are used to achieve an unlimited range of aesthetic finishes. Keystone modular block spandrels and wingwalls are also available.



Horizontal Ellipse SUPER-SPAN used to connect race traffic to a motor speedway infield in Charlotte, NC



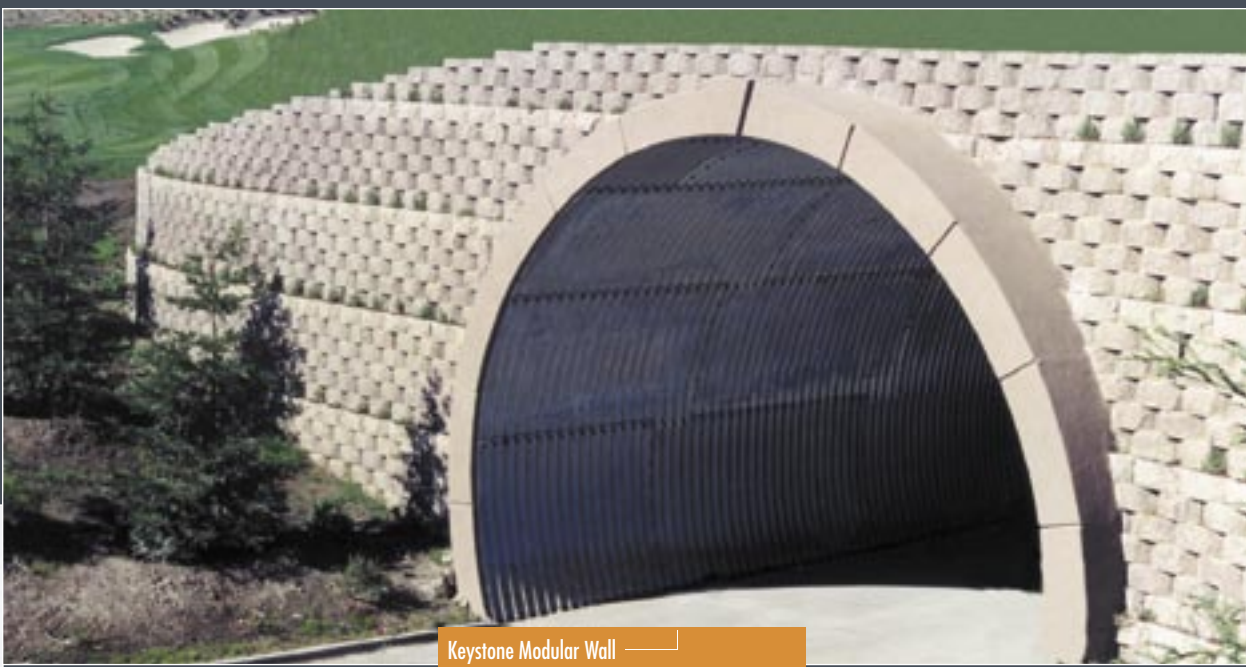
Slope Collar



Cast-in-Place Concrete



Stone-Faced Concrete



Keystone Modular Wall

Prefabricated Aluminum



# Headwall Packages

# Design-Supply-Build

CONTECH designs and supplies bridges, underground storm water detention systems and other civil engineering structures that lower costs and speed completion. We manufacture the materials, guarantee their quality and assemble the structure to spec.

## Bridge . . . Stream Enclosure

A high-speed feeder onto I-75 in Ohio encountered a meandering stream with a wildlife crossing and citizens' concerns. CONTECH furnished the design, materials, assembly and inspection services for a 46-foot span and 27-foot rise high-profile-arch SUPER-SPAN, allowing the owner to cross the sensitive stream without disturbing the natural path of the animals while soothing public concern.

## High-Fill Culverts

The West Virginia Dept. of Highways needed to enclose a stream nearly 50 feet beneath its Corridor H expansion. A concrete structure was specified, but because of the fill height and high cost, an alternative was sought. CONTECH designed, supplied and erected four MULTI-PLATE steel culverts, saving the WVDOH \$500,000. The 15-foot diameter, 623-foot long structures have paved inverts and are asphalt-coated for protection against acid mine runoff.

## Bridge Rehabilitation

An aging stone bridge in Trumansburg, New York, was scheduled for replacement at a price of \$2,000,000. This included \$600,000 for a new bridge and \$1,400,000 to shore up historic buildings on each of its corners. CONTECH proposed rehabilitation, providing the structural design and supplying aluminum structural plates to reline the bridge's arch. This innovative solution saved the NYSDOT, \$1,740,000.



## Bridge . . . Keystone Walls

The Walton County Government and Education Center required a total of 25 bridges to cross wetlands at six locations. Carlan Killam Consulting Group of Pensacola, Florida, designers of the project, approached CONTECH to supply the bridges.

To accelerate the design phase, CONTECH provided the foundation pile designs and coordinated the bridge headwall designs with Keystone Walls in Minneapolis, MN. "Within 10 days we had conceptual drawings, including preliminary pile designs for the bridge foundations," stated Paul Trimble, senior project manager of Carlan Killam.

Additionally, CONTECH had a sub-contractual agreement for the bridge assembly because the contractor had little experience with plate structures and would have been unable to meet the construction schedule.

With the CONTECH Design-Supply-Build package, the project came in on time and under budget.



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# Innovative Solutions for Bridges, Underpasses, Tunnels, and Grade Separations

CONTECH is the only national producer of metal plate bridge structures; two-lane and pedestrian steel bridges; concrete arch structures; segmental modular block walls; corrugated steel, aluminum and plastic pipes; and, geosynthetic products for the highway, drainage, sewage and site-improvement markets. Innovative applications for bridges, underpasses, tunnels, conveyor conduits, detention systems, storm drainage, sewage lines, retaining walls and erosion control begin at CONTECH.

We offer a wide array of innovative engineering solutions for site improvement for both initial development and rehabilitation of existing structures. Our products are based on a century of research and practical field experience. You can use them with complete confidence in their strength and durability as well as being assured you are making an economically wise investment.



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