Rehabilitating Aging Structures

The New Infrastructure

As our infrastructure ages, the roadway, water management and sewer control systems are deteriorating and losing integrity. Also, changing service conditions affect once-competent structures so that they may no longer meet load or traffic requirements.

Maintaining these critical structures is a major challenge. Today, perhaps more than ever, keeping our infrastructure safe and workable with limited financial resources requires innovative solutions. Replacement can be costly and time consuming.

Rehabilitation

It is often possible to salvage failing structures and eliminate the time, cost and safety problems of complete replacement. Restoring structural and/or hydraulic capacity without road closure is usually achieved with less time, expense and disruption than the replacement alternative.

CONTECH® offers a variety of products and systems, combined with more than 100 years of experience, to facilitate rehabilitation of storm and sanitary sewers, culverts and bridges.

A Variety of Materials and Structures for More Efficient Rehabilitation

Optimum Liner Size

Lining inadequate or failing structures with corrugated metal material or plastic pipe uses little of the available area, thereby preserving the maximum amount of the original opening.

Due to the hydraulic efficiency of CONTECH products, often a smaller structure provides the same hydraulic capacity as the original because of the low Manning “n” factors of A-2000™, A2™ Liner Pipe, HEL-COR™ and ULTRA FLO®.

Variety of Shapes

Existing pipes and arches are generally lined with structures of the same shape, though slightly smaller in size. Rectangular openings can be lined with round, elliptical or pipe-arch structures. Corrugated metal structures can fit almost any existing shape.

Backfilling

Grout is generally placed in the annulus between the old and new structures. Correctly placed, grout prevents further distortion of the old structure and minimizes concentrated loads on the new lining.

Fill material can be sand, “sand-cement mixes,” grout, a flowable fill or concrete mix. The choice of fill depends upon the type of structure, void area, strength requirements and equipment available.
Rehabilitating Storm and Sanitary Sewers and Small Culverts

Reline drainage structures with hydraulically efficient corrugated steel, aluminum or PVC pipe. ULTRA FLO and HEL-COR are available in standard diameters through 120” and 144” respectively. Special diameters are also available in both products. The PVC pipe systems, A-2000 and A2 Liner Pipe—used for both drainage structures and sanitary sewers—are available through 36” diameter.

Rehabilitating Bridges and Large Culverts

Bridges and large culverts can be relined by erecting CONTECH plate structures inside existing structures. Or, the new plate structure can be erected outside and threaded into existing openings. CONTECH’s MULTI-PLATE®, Aluminum Structural Plate and Two-Flange Liner 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.

The New York State department of Transportation relined this aging drainage structure with steel ULTRA-FLO pipe, restoring its hydraulic and structural properties while avoiding costly and time-consuming replacement.
A Variety of Solutions and Field-Proven Performance

Installation Site
Pennsylvania DOT Project SR6060(18B)
Pittsburgh, Pennsylvania

Materials
Corrugated Steel Pipe: 
48” Diameter

Project details
Corrugated Steel Pipe was used to repair a failing reinforced concrete pipe under a height of cover of 91 feet. Grout couplings were furnished to facilitate concrete grout placement between the new corrugated steel pipe and the existing concrete pipe.

Installation Site
Missouri DOT
Carroll County, Missouri

Materials
Aluminized Steel Type 2 Courrgated Steel Pipe: 10 gage, 10’ Diameter

Project Details
Aluminized Steel Type 2 Coated Corrugated Steel Pipe was used to reline an existing concrete box culvert on Route 65 – a major four-lane highway in North-Central Missouri. The initial consideration was to remove and replace the existing twin 12’x12’ culverts but this relining alternative proved to be less expensive, provided the quickest turnaround time for construction and was the most convenient for traffic flow on the highway. The Route 65 Reline project was a great success and won a MODOT Practical Design Award in the Small Bridge Replacement category.
Versatility for Handling Difficult Rehabilitation Situations

Installation Site
Charles County, Maryland

Materials
A2 Liner PVC Pipe: 27" and 30" Diameter

Project Details
A 20+ year-old concrete interceptor and sanitary sewer line had significant structural damage, primarily caused by high levels of hydrogen sulfide. Plastic pipe segmental sliplining was recommended for the area with the high level loading (both vehicular and rail) and with the most restricted access. About 700 feet of PVC A2 Liner Pipe was used primarily in the area under the roadway and railroad crossings.

Installation Site
Hampton Blvd. & 27th Street
Norfolk, Virginia

Materials
PVC A2 Liner Pipe: 21” Diameter

Project Details
A2 Liner Pipe was sliplined into a deteriorating 24” reinforced concrete pipe storm sewer. Water flow was maintained without by-pass pumping during the installation. Concrete grout was used to fill voids between the new and existing pipes. Vehicle traffic at the busy intersection was not disrupted.
Installation Site
Metro North Railroad Bridge #8014R
Stamford, Connecticut

Materials
Aluminum Structural Plate Arch: 25’ span x 16'-11” rise.

Project Details
The aluminum arch was installed during August 2002 while the rail lines were live. A custom designed shape maximized the waterway area and minimized the grout volume.

Installation Site
Dayton-Springfield Road
Clark County, Ohio

Materials
CON/SPAN® Bridge System: 28’ span x 11’ rise

Project Details
A CON/SPAN bridge provided an economical, speedy solution that reduced the road closure time to just a few hours per day over a 12-day period. This structure was able to utilize the existing foundations of the conventional beam bridge that exhibited significant deterioration in the concrete superstructure and upper portions of the abutments. In a single day, the CON/SPAN arches were slid into position leaving the existing beam bridge and abutments in place.
Rehabilitating Aging Structures

Installation Site
Lake Kiowa Gated Community
Gainesville, Texas
Materials
Bridge Plank: 8-gauge, 9' x 3' and 7-gauge, 6' x 2'
Project Details
After 40 years of weathering and water-related wear, the bridges needed some significant repair. They were rebuilt in a cost-effective, quality fashion, within a limited budget. Using corrugated hot-dipped galvanized bridge decking avoided any environmental problems that would pollute the water. The decking was cut, welded and placed prior to placing an asphalt overlay.

Installation Site
U.S. Route 11/Pittston Ave.
Scranton, Pennsylvania
Materials
Aluminum Structural Plate and Galvanized Steel Tunnel Liner Plate Arch: 13' span x 11'4" rise. Tensar® Geogrid and ArmorFlex® revetment mattress
Project Details
A massive sinkhole developed along the stream banks of Brook Street, with unstable 17-degree downhill slopes, leading to the collapse of a large section of U.S. Route 11 stone-arch culvert. A 14 foot tall temporary Tensar Geogrid wall with fabric facing was designed to provide temporary protection during the initial stabilization effort. ArmorFlex revetment mattress material was used on the north side to protect the slope and enhance temporary stability. CONTECH also proposed placing 3-30' sections of aluminum arch in the fully exposed area and Tunnel Liner Plate to reline the section that was intact. This was the safest and most cost effective solution possible. The entire project was completed in about 3 months.
Rehabilitation—An Economical Alternative

Installation Site
Connecticut DOT Emergency Declaration, Project #80-125

Materials
Galvanized Steel Tunnel Liner Plate and Aluminum Tunnel Liner Plate.

Project Details
A 335' long, twin 14' ellipsed steel structural plate pipe structure installed in 1964 under 35' of fill was lined with a galvanized steel Tunnel Liner Plate, with high strength mortar lining for hydraulic efficiency, on the upstream end. On the downstream end, an aluminum Tunnel Liner Plate, without lining, was used to reduce water velocity at outlet. New structures have diameters from 154" to 172". The new structures were designed to carry the full load above.

Installation Site
County Road 707 (Indian River Drive shoreline) in St. Lucy County, Florida

Materials
ArmorFlex® articulated concrete blocks

Project Details
The Atlantic hurricane season resulted in a restoration plan for reconstructing the failed banks to a 2H:1V grade, lining the bottom 6 vertical feet with ArmorFlex 50S and 50ECO articulated concrete block, and placing geotextile reinforced sod on the upper portion of the bank.
Retrofit Meets Requirements for the National Pollutant Discharge Eliminations

**Installation Site**
Seattle-Tacoma (SeaTac) International Airport
Seattle, Washington

**Materials**
DownSpout Stormwater Management StormFilter® radial-flow delivery systems

**Project Details**
The Port of Seattle discovered zinc leaching into runoff from a cargo building roof that was coated with zinc-aluminum alloy. The Port decided to deploy a filtration treatment in an above-ground configuration with DownSpout StormFilter systems provided by CONTECH Stormwater Solutions consisting of a filtration treatment using organic media.
The New Infrastructure

Maintaining Infrastructure through Rehabilitation
Rehabilitation

As infrastructure ages, it loses integrity. Maintaining these structures—while eliminating, or at least reducing, the time, costs and safety problems of complete replacement—is where CONTECH solutions can assist. We’ve helped rehabilitate sites across the nation, ranging from roads and bridges to sanitary stormwater and erosion control systems. Many customized CONTECH products are used to reline old stone, brick and concrete bridges, culverts, storm sewers and tunnels. Aluminum and steel structural plate, corrugated metal pipe, steel tunnel liner plate and A2 Liner Pipe (PVC) minimize above ground disturbance by eliminating full, open cuts.

CONTECH Construction Products Inc., is a leading civil engineering site solutions products and services company. Headquartered in West Chester, Ohio, CONTECH is the only company that can provide bridge, drainage, erosion control, retaining wall, sanitary, soil stabilization and stormwater solutions on a national scale. Its product portfolio is based on more than a century of research and practical field experience serving the highway, drainage, sewage and site-improvement markets.
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