Going With The Flow
Open Bottom Structures for Fish Migration

Tom Hennessey, Bridge Consultant MA,CT,RI
Agenda

- Contech Introduction
- Solution Overview
- Foundation Discussion
- Scour Discussion
- Applications
- Partnering With Contech

Options & Support Specific to Your Project Needs

**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
Bridges & Structures, Stormwater Management, Pipe, Erosion Control and Retaining Walls
Contech. Your project partner.

- Over 60 Engineers and CAD Specialists
- 200 Contech Specialists covering all 50 States
- Over 100 years experience in the Construction Industry

<table>
<thead>
<tr>
<th>Precast</th>
<th>Plate</th>
<th>Truss</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 years</td>
<td>80 years</td>
<td>60 years</td>
</tr>
<tr>
<td>8,000 installations</td>
<td>50,000 installations</td>
<td>20,000 installations</td>
</tr>
</tbody>
</table>

................................. Comprehensive Engineering Support .................................

................................. Installations In Every State .................................
Clear Span Bridges

Clear spans to 300’
Contech Structural Plate
Durability Benefits of Clear Span

BridgeCor

- Deep corrugated metal structures
  Spans up to 80'  
  AASHTO approved  
  9X stiffer than MULTI-PLATE  
  Accelerated construction methods

Improves Long Term Durability

- No Invert - Keep normal flows away from structure
- Exposure to high flows for short duration
- Free draining backfill
- Clear span sensitive wetlands
Lightweight, Bolted Plate Construction

Freight economy

Efficient assembly

Lift and set in place

Handles highway loading
Precast – CON/SPAN and BEBO Concrete Arches
Modular Components

- Precast Foundation
- Precast Arch Unit
- Precast Headwall
- Precast Wingwall
- Twin Leaf Construction
- Curved Alignment
Any Application, Many Solutions – You Optimize

<table>
<thead>
<tr>
<th>Wetlands &amp; Clear Spanning</th>
<th>Hydraulic Optimization</th>
<th>Clearance Box/Grade Separation Optimization</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON/SPAN® O-Series™</td>
<td>CON/SPAN® O-Series™</td>
<td>CON/SPAN® B-Series</td>
</tr>
<tr>
<td>Maximizing span for sensitive environmental conditions.</td>
<td>Maximizing waterway and span area for hydraulic efficiency.</td>
<td>Minimizing excess materials, while closely matching clearance diagram.</td>
</tr>
</tbody>
</table>
## Design Challenges

**CLEAR SPANNING**
- Clear span required = 25’
- Required rise = 4’ min / 10’ max
- No hydraulic reqmts, clear-span only

**HYDRAULICS**
- Clear span required = 25’
- Waterway required = 190 sf
- Roadway to stream invert = 13’

<table>
<thead>
<tr>
<th></th>
<th>O-Series</th>
<th>B-Series</th>
<th>% Diff</th>
<th>O-Series</th>
<th>B-Series</th>
<th>% Diff</th>
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<tbody>
<tr>
<td><strong>Shape</strong></td>
<td>0425</td>
<td>-</td>
<td>-</td>
<td>0327</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Span (ft)</strong></td>
<td>25</td>
<td>28</td>
<td>-11%</td>
<td>27</td>
<td>28</td>
<td>-4%</td>
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<tr>
<td><strong>Rise (ft)</strong></td>
<td>5</td>
<td>6</td>
<td>-17%</td>
<td>9.4</td>
<td>8</td>
<td>18%</td>
</tr>
<tr>
<td><strong>WW Area (sf)</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>194</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td><strong>Concrete (tons/ft)</strong></td>
<td>1.96</td>
<td>2.84</td>
<td>-31%</td>
<td>2.64</td>
<td>3.14</td>
<td>-16%</td>
</tr>
<tr>
<td><strong>Steel (lb/ft)</strong></td>
<td>108</td>
<td>211</td>
<td>-49%</td>
<td>137</td>
<td>227</td>
<td>-40%</td>
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<tr>
<td><strong>Lay length (ft)</strong></td>
<td>8</td>
<td>6</td>
<td>33%</td>
<td>8</td>
<td>6</td>
<td>33%</td>
</tr>
<tr>
<td><strong>Weight (tons/unit)</strong></td>
<td>15.68</td>
<td>17.04</td>
<td>-8%</td>
<td>21.12</td>
<td>18.84</td>
<td>12%</td>
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</table>
Structure Selection and Hydraulic Assistance
HEC-RAS Bridge Coordinates
200 SF Waterway
0-300 Series
27’ Span
BEBO Arch Systems
Footing Reactions Minimize Stream Disturbance

Distance between footings is maximized
A precast foundation system that blends the speed of precast with the economy of cast-in-place
SPEED OF PRECAST. ECONOMY OF CAST-IN-PLACE.
CIP FILL PROCESS
Copicut Reservoir Dam
Copicut Reservoir Dam
Express Footers arrive with majority of steel reinforcement tied at manufacturing facility. Place on 4” minimum granular sub-footing.
Secure footing with rebar anchors provided, and lap splice between units.

Assemble first ring of plate structure.
Place plate structure on footers and spread streambed material.
Local Applications
Don’t Touch The Wetland
ALBC Full Invert With Fish Baffles
Trout Creek outlet after restoration 2005
Reline, Rehab, Liner Plate

PLATE

PRECAST

TUNNEL LINER PLATE

www.ContechES.com
Reline before Fish Ladder
RI DOT Appanaug Circular Bridge Warwick, RI
2 Years after installation
Working with Contech
Building Blocks to a successful Project

Solution Development

Design Support

Installation

DYOB® Design Your Own Bridge

To get started, choose a structure type:

- Aluminum Box Culvert
- MULTI-PLATE SUPER-SPAN
- CON/SPAN BEBO
- U.S. Bridge Continental

DYO ALBC
DYO Plate
DYO Precast
DYO Truss
Contract Drawings
Building Blocks to a Successful Project

- Attending Pre-Bid Meetings
- Holding Preconstruction Meeting
- Field Consultants Attend all Installations
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Questions?

CROSSINGS. CULVERTS. BRIDGES. CONTECH.