



■ Bridges



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Reference Details:

Owner City of Toledo, Ohio, USA +++ **General Contractor** FruCon Corporation, Ballwin, Missouri, USA +++ **Design and Engineering** Figg Bridge Engineers, Inc., Tallahassee, Florida, USA +++ **Consulting Engineer** Howard Needles Tammen & Bergendoff (HNTB), NY, USA and Parsons Brinkerhoff, NY, USA

DSI Services Supply of all components of the cable stays including strands, pylon saddles, steel sheathing, stay anchorages, prestressing jacks etc: 734,568 m epoxy-coated strands 0.6", 40 cable anchorages, 4,267 m sheathing, 20 cradles; Supply and provision of the materials, equipment, engineering and technical assistance for all post-tensioning requirements.



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Maumee stay cable bridge breaks world record

New River Crossing in Ohio, USA

Construction of the new six-lane high-level bridge over the Maumee river, which is located down-stream from the existing Craig Memorial Bridge near Toledo, Ohio, will start in autumn 2003. The region's new signature landmark bridge will have a vertical clearance of 36.5 m and a 122 m wide shipping channel; it's overall length will be 2,682 m. The stay cables, which will carry the bridge deck in a single plane of stays and from one pylon only are designed in accordance with the revolutionary "cradle system", developed by Figg Bridge Engineers, Inc., Tallahassee, Florida. In the new system the stays are not individually anchored into the pylon, but a continuous cable stay runs from the bridge deck, through the cradle at the top of the pylon, and back down to the bridge deck in the subsequent span.

In addition to significant reductions in material costs and construction period, the "cradle system" allows the pylon to be slender and aesthetically pleasing since the need for pylon cable anchors has been eliminated. Utilization of traditional anchor systems would have required the pylon to be at least an additional 3 m in width.

The stay cables for the Maumee bridge consist of 82 to 156-0.6" epoxy-coated strands encased in stainless steel sheathing -156 strands per stay cable is currently world record for cable-stayed bridge structures. The high strength steel cables are encased in a stainless steel sheathing and each strand will pass through its own individual stainless steel tube in the cradle assembly, eliminating strand-to-strand interaction in the curved portion of the cable.

The project provides for 40 "reference" strands, which may be individually removed at desired time intervals for inspection (after 15 years, 50 years, etc.), in order to verify the condition of the stays during the "service life" of the bridge at any time, without compromising its integrity. The chosen stay cable design allows the owner savings of over US\$ 3 million, with a total construction volume of about US\$ 240 million.

Given the significance of the new system, along with additional innovations on the Maumee bridge project, the Ohio authorities required a comprehensive testing program before approval to proceed. DSI was the low bidder to furnish the entire stay system including all epoxy-coated strands, anchors, and sheathing testing prior to building the bridge.

The Construction Technology Laboratory (CTL) in Chicago was awarded the contract to perform extensive testing for the project including axial testing, combined axial/flexural testing, and individual strand testing. Figg experts closely monitored the test procedures and results. Acceptance testing was completed in early December 2001 and all aspects were found satisfactory. DSI supplied the test components as well as the technical assistance for the preparation of these record-breaking tests.

The owner pre-purchased the entire stay system directly from DSI before awarding the contract to the general contractor who did not, as usual, participate in the contracting of the stay cables. This is a first for America. The contractor is provided with the components of the stay cable system in line with the construction process.

In addition to providing the entire stay cable system, DSI was appointed by the main contractor FruCon Corporation to supply the complete longitudinal and transverse post-tensioning work for the bridge deck.

Also DSI offered a special proposal to replace the foundation caisson reinforcing steel with *GEWI*® Steel. This significantly reduced the reinforcement density and the installation labor costs, a savings for both the owner and the contractor.

To comply with local residents' wishes the pylon is faceted with backlit glass on four sides for the top 60 m, referring to the city's rich heritage in the glass industry. Construction will start in fall 2003 and completion is scheduled for 2006.

We wish further successful planning and completion of this important infrastructure project for the city of Toledo.

▶ [Link to Maumee Stay Cable Bridge Webcam](#) ▶ [Download DSI Reference \(pdf-format\)](#)

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