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2003 American Segmental Bridge Institute

BRIDGE AWARD OF EXCELLENCE COMPETITION

The American Segmental Bridge Institute (ASBI) honors seven projects in its inaugural Bridge Award of Excellence Competition, cosponsored by *Concrete Products* magazine. Judging for the 2003 program took place at the Federal Highway Administration's Federal Lands Bridge Office in Sterling, Va. Members of the Awards Jury were :

Shoukry Elnahal, Team Leader, FHWA Resource Center Structures Technical Service Team

Robert J. Healy, Deputy Director, Office of Bridge Development, Maryland State Highway Administration

Malcolm T. Kerley, Chair, AASHTO Subcommittee on Bridges and Structures, and Chief Engineer for Program Development Virginia Department of Transportation

James E. Roberts, Consultant (Caltrans-retired) Sacramento, Calif.

All concrete segmental or cable-stayed bridges located within the 50 United States and opened to the public or dedicated between January 1, 2001, and August 1, 2003, were eligible for the 2003 awards competition. Entrants in the competition were judged on the basis of the following criteria:

- Innovation of Design and/or Construction
- Rapid Construction
- Aesthetics and/or Harmony with Environment
- Cost Competitiveness
- Minimization of Construction Impact on the Traveling Public (when applicable)

The jury recognized these projects equally as Bridge Award of Excellence winners:

- Big I Interchange (I-25/I-40), Albuquerque, N.M.
- Broadway Bridge, Daytona Beach, Fla.
- CA/T: I-93 Viaducts and Ramps north of Charles River, Boston, Mass.
- CA/T: C09A4 Bridges, Boston, Mass.
- Foothills Parkway Bridges, Blount County, Tenn.
- Smart Road Bridge, near Blacksburg, Va.
- Vietnam Veterans Memorial Bridge, Richmond, Va.

Awards will be presented to bridge owners' representatives during the 2003 ASBI Convention Awards Luncheon, November 3 at the Hyatt Regency, Dallas, Texas. Following is a showcase of the projects, with Institute members noted in **bold**.

ASBI

Federal Lands Bridge Engineer and ASBI Awards Committee Chair Hala Elgaaly (center) joins members of the jury (from left) James Roberts, Robert Healy, Shoukry Elnahal, and Malcolm Kerley.

Broadway Bridge – Daytona Beach, Florida

Demonstrating the growing importance of bridge aesthetics, this 3,008-ft. precast segmental concrete structure carries U.S. 92, International Speedway Boulevard, over the Intracoastal Waterway. Design elements were selected in community charettes, allowing the bridge to present a public image determined largely by the local populace. A community-wide celebration including a parade, fireworks and a street fair marked the dedication of the bridge in July 2001.

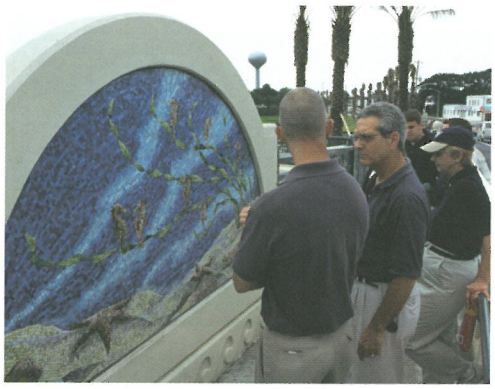
Comprised of twin parallel structures, the Broadway Bridge has a total deck area of 260,152 sq. ft. Segments cast in Flagler Beach, Fla., were transported by barge 20 miles down the Intracoastal Waterway. The contractor used three machines and the shortline casting method to fabricate the project's 352 segments, which are 48 ft. wide and vary in depth from 13 ft. to 7 ft. 9 in. The maximum segment weight is 120 tons. To reduce construction time, the contractor erected multiple cantilevers concurrently, placing up to eight segments daily. The bridge was designed with an as-cast riding surface, where one-half inch of sacrificial concrete was milled to satisfy profilograph tolerances and provide an excellent riding surface.

Elliptically shaped piers were cast in place. The lower portion is solid to minimize potential vessel impact damage. At a predetermined point above the mean water elevation, the piers transition to a voided element to reduce overall weight. Pier heights vary from 12 ft. 8 in. to 77 ft. Due to the existing street elevation at the western landing of the bridge, a 34,500-sq.-ft. cast-in-place flat slab was placed with bi-directional post-tensioning to limit cracking and chloride ion intrusion in the saltwater environment. The flat slab transitions to concrete segments once adequate clearance is achieved.

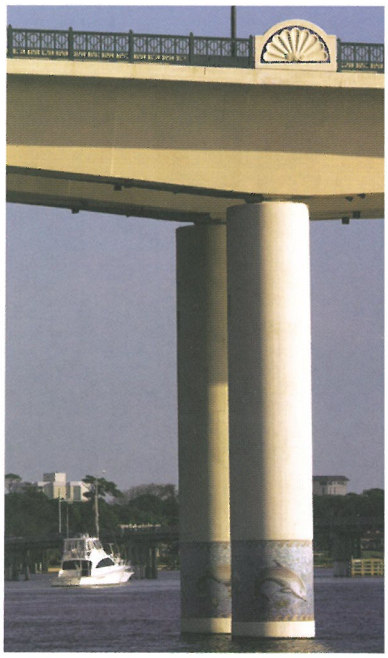
Pursuing a Timeless Ecology theme, charette participants selected colorful, glass mosaic tile designs of wildlife indigenous to the Atlantic Coast. Ten-ft.-tall mosaic murals of dolphins and manatees wrap each of the bridge's 26 piers. The mosaic design is constant, but shifts by 10 degrees on each pier, providing a sense of motion to the manatees and dolphins. Additionally, as pedestrians cross the bridge on the wide separated sidewalk, they experience 18 different wildlife mosaics, one at each of the span segments. The mosaics are repeated on the opposite walkway, for a total of 36 images.

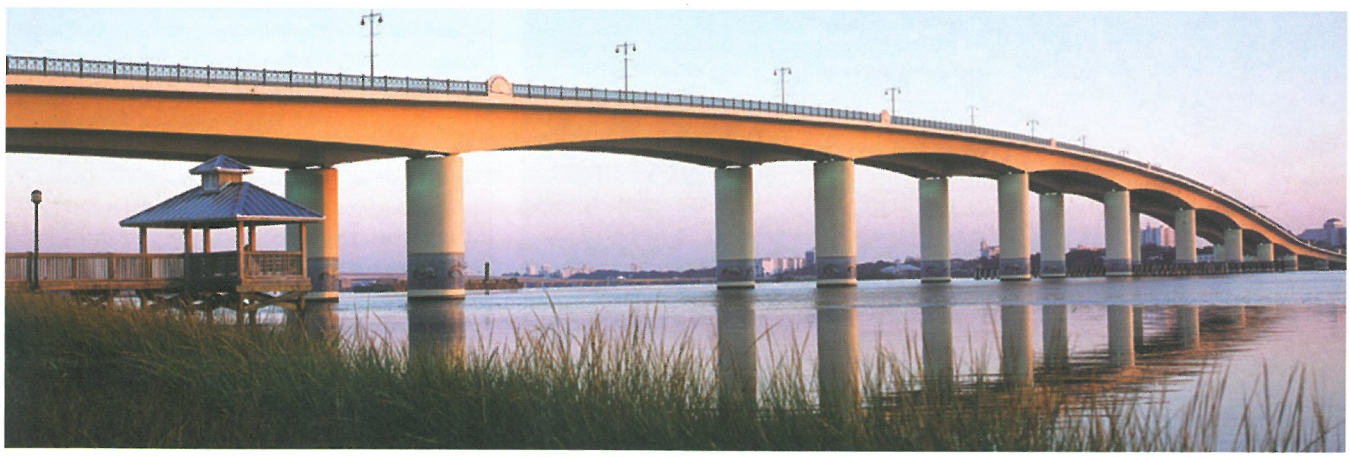
PROJECT PRINCIPALS, SUPPLIERS

Owner: **Florida DOT, District #5**
Designer: **FIGG**
Contractor: Misener Marine, Inc.
Construction Engineering:
Janssen & Spaans Engineering, Inc.
Construction Engineering Inspection: **Parsons**
Precaster: Misener Marine, Inc.
Post-Tensioning Materials:
VSL (strand)/**DSI USA, Inc.** (bars)
Construction Equipment: Misener Marine, Inc.
Prepackaged Grout: **Chem Rex/Master Builders**
Epoxy: Pilgrim Permacoat, Inc.
Expansion joints: **The D.S. Brown Company**
Bearings: Structural Accessories



Jury:
"A BEAUTIFUL, WELL-PROPORTIONED STRUCTURE. EXTENSIVE COMMUNITY INVOLVEMENT IN SELECTION OF AESTHETIC DESIGN ELEMENTS. THE USE OF MOSAICS ON DIFFERENT ELEMENTS PROVIDES UNUSUAL GRACE AND ELEGANCE."





Smart Road Bridge – near Blacksburg, Virginia

The 1,985-ft. Smart Road Bridge located outside of Blacksburg, Virginia, is a cast-in-place concrete segmental box girder structure built by the balanced cantilever method with form travelers. Comprising the second phase of the 5.7-mile Smart Road that will eventually connect to Interstate 81, it was dedicated in May 2001 and serves as a state-of-the-art test bed for researchers from Virginia Tech Transportation Institute (VTTI).

Cast-in-place, segmental box girder construction was the preferred technology from aesthetic, economic and maintenance points of view. An added benefit of the open box girder is the ability to house testing and monitoring equipment associated with the research mission of the Smart Road. Typical research supports advancement of the transportation industry, including improved communications systems, variable message signs, experimental pavements and intelligent transportation systems.

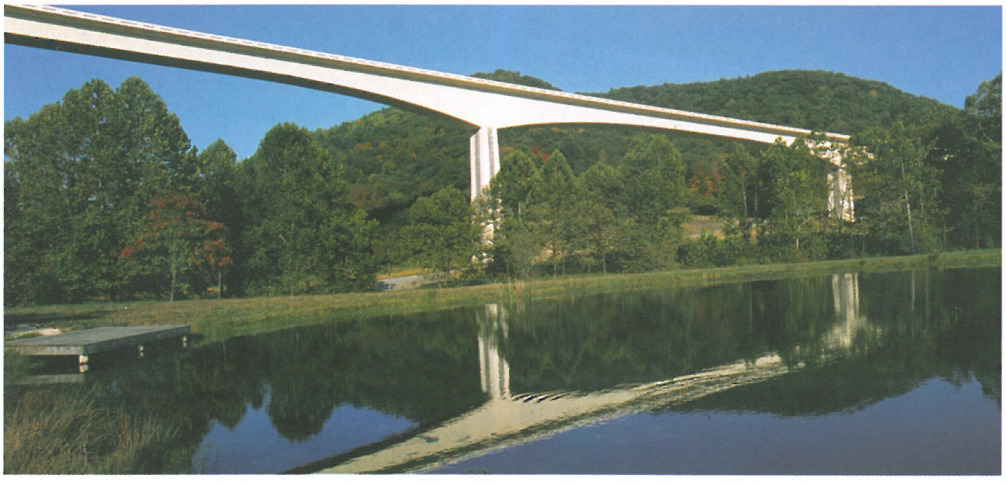
The Smart Road Bridge contains a unique monolithic connection designed for the pier/superstructure interface, with the longitudinal faces of the piers continuing vertically until they intersect with the superstructure web wall. In addition to providing an aesthetic feature, this monolithic connection eliminated the bearings normally found at this juncture as well as the associated temporary falsework towers for resisting loads during construction. The Smart Road Bridge is a single continuous unit, with expansion joints only at each end. Steel finger joints were used to accommodate large movements at these locations. The minimal number of expansion joints decreased maintenance requirements and associated expense, along with allowing traffic to pass over the bridge at low noise levels, which is desirable in this rural valley.

Both the substructure and superstructure of the bridge consist of high performance concrete with low-permeability and a compressive strength of 8,000 psi. The low permeability mix was specified by Virginia Department of Transportation and developed by the VDOT Research Council.

The rural beauty of the Ellett Valley in southwestern Virginia made aesthetics a major priority for VDOT and the designer. Considering the mix of pasture land and rural residential areas under and around the bridge, preserving the open views and scenic impact of the valley was deemed essential. This resulted in long spans to minimize the number of piers in the valley. The bridge rises up to 175 feet above the valley and features three interior spans of 472 ft., with 284-ft. end spans. In order to address local citizens' concerns about the bridge, VDOT formed a Citizen's Advisory Board that provided input on various elements of the bridge design. The designer prepared options that were within the owner's budget for presentation to the group. Participants selected the aesthetic treatment for the piers in addition to such elements as an open barrier rail (to provide drivers with unobstructed views of the valley) and the finish color (light tan) applied to the cast-in-place concrete.

PROJECT PRINCIPALS, SUPPLIERS

Owner: Virginia DOT
Designer: **FIGG**
Contractor: PCL Civil Constructors, Inc.
Construction Engineering:
Janssen & Spaans Engineering, Inc.
Construction Engineering Inspection: **FIGG**
Post-Tensioning Materials, Form Travelers:
AVAR Construction Systems, Inc.
Prepackaged Grout: **Chem Rex/Master Builders**
Expansion Joints: Lewis
Bearings: **The D.S. Brown Company**



Jury:
"THE BRIDGE OUTLINE FLOWS WELL AND IS GEOMETRICALLY SENSITIVE TO THE ENVIRONMENT. MONOLITHIC PIER TO SUPERSTRUCTURE CONNECTIONS AND ELIMINATION OF INTERMEDIATE ROADWAY JOINTS ARE GOOD DESIGN FEATURES. A VERY IMPRESSIVE AND BEAUTIFUL BRIDGE!"