I-59 / I-20 CBD Bridge Replacement
Birmingham, AL

Presented by:
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William T. Colquett, P.E.
State Bridge Engineer
Alabama Department of Transportation

Phase A
Phase 1
Phase 2
Phase 3

Opened to traffic in 1971
Designed for 80,000 vehicles per day
Current traffic is 160,000 vehicles per day
Projected 2035 traffic is 225,000 vehicles per day

Eliminate 3 left lane entrance and exit ramps that are unsafe
Add lanes and shoulders so disabled vehicles can be removed without stopping traffic

Project Needs - Functionally Obsolete

Project Needs - Safety
Project Needs - Lifespan

- Original Construction – Early 1970’s
- Nearing end of 50-year lifespan
- Deteriorating bridge deck

Project Decision

- This infrastructure is functionally obsolete and must be replaced in the interest of public safety and to ease the flow of commerce and traffic.

Why Segmental?

- Minimize duration of interstate closure by offsite prefabrication and rapid construction methods
- Increase span lengths
- Reduce noise
- Improve aesthetics
Improved Aesthetics

Project Team

- Owner – Alabama Department of Transportation
- Design Engineer – Volkert, Inc.
- Segmental Superstructure Engineer – Corven Engineering, Inc.
- Post-Tensioning Contractor – Structural Technologies (VSL)
- Erection Equipment – Structural Technologies (VSL)
- Contractor’s Engineer – McNary-Bergeron & Associates
- Contractor’s Engineer – Infrastructure Consulting & Engineering

Bridge Design - Substructure

Lloyd L. Pitts, P.E.
Chief Bridge Engineer
Volkert, Inc.
Substructure

Challenges
• I-59/20 full closure for up to 14-months
• Limited vertical clearance under existing bridges
• Varying geotechnical conditions along project corridor
• Utility conflicts

Solutions
• Low overhead equipment
• Precast columns
• Multiple foundation types
Piers

- Contractor elected to precast the piers
- Piers are cast as two (2) separate pieces – columns and caps
- Reinforcing is made continuous with grouted couplers
Superstructure

- Deck Area = 1,000,000 square feet
- Four Mainline Girder Lengths = 6,600-ft (each)
- Number of Spans = 176
- Typical Span Lengths = 135-ft to 165-ft
- Typical Segment Depth = 9-ft
- Typical Segment Length = 12-ft
- Span-by-Span Segment Erection
Casting Yard

Typical Segments
• 1,972 Segments
• 8 Beds

Pier Segments
• 236 Segments
• 2 Beds

EJ Segments
• 108 Segments
• 1 Bed

Erection Method

• Span-by-Span with shoring towers
• Method previously used by VSL overseas
• Suitable for bridges with ground access for shoring towers

Advantages include:
• Allows multiple headings (8 planned)
• Allows non-linear construction
• Easily handles bridge curvature
• Reduces risk for delays
Erection Method

Erection Method

Erection Method

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