American Segmental Bridge Institute

36th Annual Convention
October 21 – 23
Speakers and Abstracts

Monday, October 21 — Afternoon Session

Opening of General Session	
1:30 pm – 3:00 pm	Convention Welcome, ASBI Update, and Keynote John Corven, ASBI President, *H&H*
	Georgia Segmental Bridge Construction Jeremy Johannesen, *McNary Bergeron & Johannesen* Georgia, the host of the 2024 ASBI Convention, has a long history of segmental bridge construction. This includes the first precast segmental concrete railway bridge in the United States. The Metropolitan Atlanta Rapid Transit Authority (MARTA) constructed the precast span-by-span bridge project in the mid-1980s in Atlanta for the rapid transit line. The state boasts two cast-in-place segmental cable stay bridges with the Talmadge Memorial Bridge (1991) in Savannah and the Sydney Lanier Bridge (2002) in Brunswick. And most recently the Broad Avenue Bridge over the Flint River in Albany was constructed in 2015 as cast-in-place segmental in balanced-cantilever with form travelers. This presentation will touch on the different types of segmental bridges in Georgia, including the construction, means and methods, and required construction engineering to build each bridge.

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Session 1	Technical Session – Design Concepts
3:30 pm – 4:00 pm	AASHTO Vessel Collision Design – Is the Code Sufficient for Our Most Critical Bridges? Matt Carter, *Arup* Segmental bridges are used for many of our nation's important marine crossings and vessel collision is a major consideration and cost driver on these projects. The AASHTO Bridge Design Specifications codified into general practice a fully detailed probabilistic methodology that allows it to be applied by bridge practitioners without expert knowledge in vessel collision. The Specifications were developed in the 1980s and extrapolated research primarily conducted into ship-to-ship collisions in the 1960s and 1970s. Significant change has happened since the methodology was developed including the growth of 20,000+ TEU vessels, advanced vessel navigation systems, exponential growth in digital technologies and advances in understanding of risk and reliability. What does this imply for segmental bridge owners and engineers in the coming years? The United States may be facing a program of tightening its navigational practices and strengthening its bridges to catch up with, and keep ahead of, the risks of expanding marine traffic. This presentation will review the key assumptions behind AASHTO and aims to start a dialogue on key areas where owners and engineers should be thinking beyond the code.
4:00 pm – 4:30 pm	A History of Web Principal Tension Bridge Design Specifications in the United States R. Kent Montgomery, *GM2 Associates, Inc.* Kent has authored an article on this topic that will be published in the next issue of ASPIRE.
Session 2	
4:30 pm – 5:00 pm	Leadership Awards

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Tuesday, October 22 — Morning Session

Session 3	Technical Session – Cable Supported Bridges
8:00 am – 8:30 am	Innovation in Engineering and Construction: The Cebu Cable Stayed Bridge in the Philippines Juan Novoa, *Rubrica* Laura Granda San Segundo, *Acciona Construction* The Cebu cable stayed bridge, at present the longest and tallest bridge in The Philippines, with span lengths of 6.50-64.4-60.6-390-60.6-64.4-6.50 links Cebu, the second largest city in the Philippines, with the Mactan Island. The bridge was built utilizing highly innovative techniques not often used for such a purpose in the past, such as: • Selecting high technology Rubrica underslang form travelers able to adapt to variable deck width, curved alignment and with capacity to be self-launched with minimal manpower was key. The assembly and lifting of the form travelers and the innovative use of the form-travelers to build the pylon pier table optimized schedule, cost and enhanced safety. • The innovative use of PT strands as both active and passive reinforcement for anchoring intermediate piers and deck reinforcement was particularly noteworthy, as this technique is not usually employed for space proofing and robustness enhancement. • Self-performed precast Steel and concrete delta frames were installed on top of the form travelers to industrialize the segment cycle and expedite the construction. • An innovative "clamp-shaped" pierhead was conceived to restrain the eventual uplift of the deck at the edge back-span piers. Three pairs of spherical bearing types at each clamp allowed the relative pierhead-deck movements. The two vertical level of bearings avoids uplift of the bearings, provides robustness, mitigates fatigue and enhances durability. • Deck temporary anchoring at intermediate piers with a steel structure during construction allowed the form travelers to progress and removed the final permanent deck-pier monolitical connection out of the critical path.

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Session 3	Technical Session – Cable Supported Bridges
8:30 am – 9:00 am	Performance of Carbon Fiber Strand in a Maine Cable Stay Bridge Chris Burgess, *GM2 Associates, Inc.* MaineDOT in association with FHWA used federal IBRC funds in 2006 to implement a Demonstration Project for evaluating carbon fiber strands in bridges. This program involved installing representative carbon fiber strands in the cable stays of the Penobscot Narrows Bridge and Observatory in Maine. Background will be shared about carbon fiber stay strand installation along with results from inspection and load monitoring that has been performed from 2007 through May 2024.
9:00 am – 9:30 am	Cable Replacement and Reprofiling of the Talmadge Memorial Bridge to Accommodate Taller Ships Onur Dal, *Parsons* Donn Digamon, *Georgia DOT* Gernot Komar, *Parsons* The Talmadge Memorial Bridge, a pivotal cable-stayed structure connecting Savannah and Hutchinson Island, is undergoing a significant $189-million maintenance and upgrade project. Originally completed in 1991, the bridge currently features a 1,100-ft main span carrying State Route 404 and US 17, with a 185-ft clearance over the Savannah River, which restricts the Port of Savannah's ability to accommodate the largest modern container ships. This limitation hinders the port's growth potential. To address this, the Georgia Department of Transportation (GDOT) is implementing an interim solution to extend the bridge's service life and enhance its navigational capacity. The project involves the replacement of 144 aging grouted stay cables with new ones conforming to the latest PTI DC-45 standards. This upgrade is crucial for meeting current safety and performance requirements. Additionally, the bridge's deck will be elevated to increase the air draft to as much as 206 ft, allowing for the passage of taller vessels and thus supporting the Port of Savannah's expansion. This interim measure is designed to provide a temporary but vital enhancement until a long-term replacement plan is executed. Key technical challenges in this maintenance project include the lack of detailed historical construction records, compliance with updated design codes, increased wind loading requirements, and the necessity to maintain uninterrupted traffic flow throughout the construction phase. To manage these complexities, GDOT has enlisted Parsons Transportation Group as the designer of record and awarded a $6.5-million preconstruction services contract to Kiewit Infrastructure South Co., with construction slated to begin early next year.

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Session 3	Technical Session – Cable Supported Bridges
9:30 am – 10:00 am	Design and Construction of Precast Segmental Extradosed Bridge – Mauritius - Indian Ocean Erwan Allanic, *SYSTRA International Bridge Technologies* Sanad Shamsan, *SYSTRA International Bridge Technologies* The A1-M1 Link Road project in Mauritius involved the construction of a 1 km highway, including a 3-span extradosed concrete bridge spanning the Grand River Northwest Valley on the island of Mauritius. The design faced challenges due to cyclonic winds and geological instability, requiring a detailed wind climate study and complex engineering solutions. Now that the bridge construction is completed, the bridge has significantly enhanced connectivity on the island's west coast and became a prominent national landmark, praised for its aesthetic appeal and importance to Mauritius' infrastructure.

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Session 4	Technical Session – Lessons in Spliced Girders
10:30 am – 11:00 am	Spliced Girder Bridge Construction Jeff Mehle, *McNary Bergeron & Johannesen* Similar to segmental bridges, spliced girder construction utilizes precast elements with post-tensioning. Precast elements fabricated off site can be shipped to the field and made continuous longitudinally with a cast-in-place stitch or splice and post-tensioning. The use of post-tensioning to make the girders continuous increases the span length for conventional concrete girder sections. The design and construction of spliced girders includes staged construction, temporary supports, strong backs and construction analysis. The sequence and method of construction directly impacts the final design. This presentation highlights three spliced girder projects, illustrating the method of construction, staging and construction engineering required. The projects covered in this presentation includes the Rockingham Bridge Replacement for I-90 in Rockingham, Vermont, Christina River Bridge in Wilmington, Delaware and the precast spliced arch Siebenthaler Bridge in Dayton, Ohio.
11:00 am – 11:30 am	TxDOT's Design Requirements for Segmental Bridges and Spliced Girders Igor Kafando, *TxDOT* The presentation will provide an overview of the most recent concrete segmental bridges designed in Texas and the rise of precast concrete spliced girders as an economical superstructure type. With the increased use of spliced girder superstructures, fabricator experience, contractor familiarity, and designers' knowledge of design requirements are critically important for the success of a project. TxDOT's design requirements for these superstructure types will be presented to highlight the similarities and differences. This presentation will also highlight recent projects and lessons learned from various spliced girder projects in Texas.
11:30 am – 12:00 pm	Spliced Girder Panel Discussion Igor Kafando, *TxDOT* Jeff Mehle, *McNary Bergeron & Johannesen* Andy Mish, *Modjeski and Masters* Gregg Reese, *Modjeski and Masters*

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Session 5	Technical Session – Cast-in-Place Segmental Bridges
1:30 pm – 2:00 pm	The Cast-in-Place Segmental Design of the Beaver River Bridge Matt Adams, *H&H* The Beaver River Bridge carries the PA Turnpike Mainline over the Beaver River, the CSX rail line, and the Norfolk Southern rail line in Beaver County, Pennsylvania. The project consists of two new parallel five span cast-in-place segmental bridges that will replace a steel deck truss bridge built in 1953. The new eastbound and westbound bridges will carry three 12' travel lanes, one 12' acceleration and deceleration lane, and appropriate shoulders. The new bridges are 1,645' in length and will feature 385' spans. The concrete box girder superstructures for each bridge will be 73'-4½" wide and vary in depth from 10' at mid-span to 21' at the piers. Pier heights will reach nearly 200' and will be comprised of solid base pedestals, transitioning to twin wall piers to enhance flexibility and constructibility. The segmental box girder superstructures will be built in balanced cantilever using self-advancing form travelers. The superstructure is cast monolithic with the piers in all cases. All piers are founded on 60" diameter drilled shafts, with 54" rock sockets. This presentation will focus on the designer's approach to the bridge project including both superstructure and substructure design, as the design of the substructure was particularly intricate.
2:00 pm – 2:30 pm	Spanning a Landslide – Construction Driven Design of a Balanced Cantilever Transit Bridge Ian McPherran, *Kiewit Engineering Group* Thanh Phan, *Kiewit Infrastructure West Co.* Aerial Guideway "Structure C" is a cast-in-place segmental balanced cantilever transit structure being constructed as part of the Federal Way Link Extension project for Sound Transit in Seattle, WA. This 1,100-foot-long structure is built on the side of a 50-foot-high embankment with difficult site access, environmental constraints, a narrow working corridor, and soft-soil challenges. This presentation covers the unique aspects of this structure from a design and construction perspective that led to a successful final structure delivered on-schedule. The presentation begins with an overview of the structure, span arrangement and typical sections, post-tensioning details, and the general erection sequence. The first half of the presentation focuses on the design, with a theme of construction-driven design. Design development and erection manual are described, followed by the success achieved with integrated shop drawings. The second half of the presentation focuses on construction execution and optimization. Construction topics include general site arrangement, temporary design elements (falsework, travelers, formwork, closures), construction sequencing, and numerous schedule and construction technique optimizations.

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Session 5	Technical Session – Cast-in-Place Segmental Bridges
2:30 pm – 3:00 pm	Construction of the William Halton Cast-in-Place Segmental Bridge Jerry Pfuntner, *COWI* Two new twin segmental bridges over Sixteen Mile Creek within the Halton Region of Ontario Canada are being constructed as part of the William Halton Parkway extension project. These bridges employing a movable form traveler system for a cast-in-place segmental construction technique. Once completed, the bridges will span 280 meters over three spans and each host two lanes and pedestrian walkways, providing vital connectivity between Third Line and Neyagawa Boulevard for the growing Halton Region. Due to site restrictions for the piers, the two bridges do not have the usual balanced cantilevers between the three spans. Instead, one side of the West pier cantilever is extended, or unbalanced, by 8 segment lengths which led to the addition of a temporary stay tower and deck-level external cable anchoring system for the cantilever during construction. This presentation will focus on the construction means and methods by BOT Construction Group as well as COWI's construction modifications and temporary work designs which supported BOT in the construction of these bridges within the strict project site and weather conditions.

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Session 6	Technical Session – General Topics
3:30 pm – 4:00 pm	PTI Program Launch for Qualification Verification and Multistrand Post-Tensioning Systems' Certification Miroslav Vejvoda, *Post Tensioning Institute* The PTI has developed a certification program for multistrand post-tensioning systems (PTS), with the aim of verifying qualification testing and certifying these systems. The PTI/ASBI M50.3 Specification is the basis for the program, and it is already supported by many DOTs and the FHWA. Once certified the PTS will be listed on a PTI-linked website. The owners can confidently admit these PTS to be used on their bridges, instead of having to maintain their own costly prequalification process. The program launch is in full swing and consists of bringing together the DOTs, designers, independent auditing agencies, and the PTS suppliers to all work together in endorsing the program and committing to using it. A wide participation in the program is essential to its success. The implementation phases include getting the stakeholders on board, running sample audits, and getting users familiar with the features from the technical qualification requirements to impartiality, complaints & appeals procedures, user friendliness of the website, etc. The initial system submissions will be received by the end of July 2024, the audits done through the end of October, and the certified PTS posted on the website at the same time in November 2024.

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Session 6	Technical Session – General Topics
4:00 pm – 4:30 pm	Designing and Constructing Segmental Bridges Without Drawings Oystein Ulvestad, *Arup* For centuries, 2D drawings have been the cornerstone of engineer and architect communication. While reliable, they demand significant manual work and have important limitations in the information they can carry. But are there any alternatives? In some markets, segmental bridge projects have over the past decade been successfully executed solely based on BIM models, eliminating the need for drawings. The transition has unlocked some important benefits. Automated Workflows: BIM models streamline repetitive tasks, freeing engineers to focus on creativity and problem-solving. Enhanced Quality: 3D models provide a more comprehensive view, leading to fewer errors and improved build quality. Reduced Costs: Studies show drawingless projects can achieve roughly 10% cost savings compared to traditional methods. This presentation delves into the world of drawingless design while exploring its potential to disrupt current delivery methods for American segmental bridge projects. It will showcase real-world examples, highlight the benefits (and challenges) and equip you with some key knowledge for this innovative approach.
4:30 pm – 5:00 pm	Monitoring In-Service West Seattle High-Rise Bridge Zack Van Brunt, *WSP* Jiaru "Jerry" Wu, *WSP* Monitoring of the West Seattle High-rise Bridge has continued since its return to service in September 2022 after distress of the bridge caused an emergency closure of the bridge in March 2020. Monitoring of the bridge has expanded from a localized system at the observed distressed location, to use of a full-length fiber optic structural health monitoring system calibrated to align with structural predictive models. The presentation will cover the system details, and calibration process that took place, in order to allow for real time remote detection of the formation of cracks, or propagation of existing cracks, across the fiber optics.

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Session 7	Technical Session – Complex Concrete Bridges
8:00 am – 8:30 am	A Structural Anachronism – Design and Construction of a Curved Post-Tensioned Rigid Frame Bridge Daniel Chung, *Kiewit* Jacob Grassel, *Kiewit* This presentation covers the 3rd Street Flyover Bridge in Bend, Oregon. The bridge is a post-tensioned concrete box-girder rigid frame that demonstrates the continued effectiveness of this structure type. Designed to address a challenging 318' radius curve, it outperforms chorded precast girders by avoiding excessive deck overbuild. The greenfield site facilitated the use of falsework, making a cast-in-place (CIP) concrete structure economical and practical. Aesthetically, the bridge aligns with existing structures in the corridor by featuring a variable depth box design, meeting the owner's desire for a consistent visual theme. The rigid frame effectively utilizes the deeper superstructure section at the bents to reduce demand at the shallower midspan. This structure type is rare today, as simple span bridges often use precast prestressed concrete (PSC) girders, adding a unique aspect to the project. To minimize the need for periodic inspection and maintenance, the rigid frame to footing connection utilizes chromium reinforcement. This eliminates the need for elastomeric bearings and a thrust block. The integral diaphragm connecting the substructure to the superstructure also negates the need for bearings, enhancing long-term performance.

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Session 7	Technical Session – Complex Concrete Bridges
8:30 am – 9:00 am	Innovative Use of Precast Tub Girders for High-Speed Rail Daniel Mariscal, *Jacobs* Velvet Bridges, *Jacobs* The California High-Speed Rail (CAHSR) project is a pioneer high-speed rail program in the USA undertaken by the CAHSR Authority. This rail project will run 500 miles from San Francisco to Los Angeles, with trains traveling in under three hours at speeds of over 250 MPH. Construction Package 2-3 (CP 2-3) is the second most significant construction contract executed for this design-built project. The package's construction limits extend approximately 65.5 miles from Fresno to Bakersfield through California's Central Valley. This design-built package is currently being constructed by a Dragados-Flatiron joint venture. Jacobs developed an innovative design of Adjacent Precast Tub Girders (PTG's) for six major multi-spans bridges varying in depth from 8.5 to 10.25 feet, and in span length from 89.3 to 134.0 feet with the objective of faster, safer, and more economical alternative to cast-in-place box girders. They consist of two side-to-side precast prestressed concrete half tub girders, joined together transversely and longitudinally post-tensioned once made continuous. The completed tub girders have trapezoidal cross section which are aesthetically enhanced and provide the means for construction without the use of heavy false work. Two erection methods are used, pier-to-pier and spliced segments, which reduce the need of shoring towers, thus reducing the impact to the existing traffic. Additionally, there is no need to invest in specialized equipment since conventional construction methods and equipment are used to erect the girders.

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Session 7	Technical Session – Complex Concrete Bridges
9:00 am – 9:30 am	Florida SR 80 Over Lake Worth Lagoon Bridge Approach Rafal Wuttrich, *H&H* The Florida SR 80 (Southern Boulevard) over Lake Worth Lagoon Bridge replacement features two post-tensioned concrete flat slab units flanking the main channel span. Each unit included five 72 ft long continuous spans. The slab widths are different (73'-3" west approach and 61'-3" east approach), but the design achieves a consistent look by varying the center core section while maintaining the fascia aesthetics. H&H acting as the Contractor's Engineer of Record proposed a more efficient post-tensioning and segment layout redesign supported on falsework in lieu of the incrementally launched span approach. The modified span-by-span approach includes the construction of two-span continuous subunits first on both ends followed by a center span segment acting as a closure pour. This approach provided an economical balance between the amount of required falsework support components and the required post-tensioning. Modular design of the falsework allowed for reuse with minimal adjustments.

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Session 8	Technical Session – Cast-in-Place Alternatives
10:00 am – 10:30 am	Unconventional Incrementally Launched Railway Bridge – Structural Analysis and Launching Equipment Design Patrick Noble, *COWI* Bridge 08 is a part of the new railroad along roadway 431 in Israel. The bridge is an incrementally launched twin box girder bridge with intermediate slab. The bridge has 3 continuous spans and a short-cantilevered span. The intermediate piers are skewed in a plan view resulting in different span length distribution under each box girder. The superstructure box girders have constant depth of 2.72m at the centerline of each box girder and constant width of 3.70m. The bridge is partially in a train station. Both box girders have platform wings from bridge station 71m to the end of the bridge. The intermediate slab has a constant depth with a uniform cross slope and variable vertical position accounting for the rail vertical alignment. These unique geometrical and alignment features together with extremely tight site plan led to several challenges during the design and construction engineering phase and to unconventional casting and launching equipment design.
10:30 am – 11:00 am	No Bridge is Too Big (or Small) – Fabrication of the Blue Ridge Parkway Bridge Over I-26 and Laurel Fork Bridge Replacement Jacob Rausch, *Coastal Precast Systems* Coastal Precast Systems in Wilmington, NC was the precast fabricator for the two recent segmental bridges along the Blue Ridge Parkway; Parkway Bridge over I-26 and Laurel Fork Bridge Replacement. This presentation will discuss the projects from the perspective of the precast segment fabricator. This includes the challenges of precasting segments for small projects (< 60 segments) using an existing casting yard and equipment. It also includes the use of an innovative approach for handling and hauling the segments, rotating them horizontally to increase vertical clearance while being hauled by truck.

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Session 8	Technical Session – Cast-in-Place Alternatives
11:00 am – 11:30 am	Precast Decks Erected with Temporary Mast and Stay Cables Philippe Moine, *VINCI Construction Grands Projets* Francois Fernier, *VINCI Construction Grands Projets* As part of the construction of lots N1 and N2 of the HS2 project in the UK, Balfour Beatty-VINCI JV (BBV) has developed a unique construction method for the erection of 9 High Speed Rail viaducts which total length is 4 miles. There are 3 double track and 6 single track viaducts, with: - 150 ft typical span length, - 2,742 precast segments in total. The technology draws on the erection technique that VINCI has successfully used for past projects such as the Tours-Bordeaux High Speed Rail project in France. It features the use of a temporary mast and stay cables to erect the spans with no work from the ground: segments are fed from the deck, erected at deck level with a swivel crane, fixed to the previous segment with PT bars and vertically supported with stay cables until the new span reaches the next pier. It is a safe and cost-effective method which success was made possible thanks to the collaborative approach developed by BBV with HS2 and various stakeholders, as well as VINCI in-house technical departments and SYSTRA (member of the Mott-SYSTRA Design JV). Construction is on-going.
11:30 am – 12:00 pm	Closing Remarks by ASBI President and Executive Director John Corven, *H&H* Gregg Freeby, *ASBI*