November 2017 ABC-UTC Webinar Featured Presentation: Prestressed/Precast Florida-Slab-Beams for Robust Local Bridges and Accelerated Construction	
Q&A Session: Questions	**Responses**
Design	
What are the current limits applied to implementation of this product?	Limited to off-system bridges with Low ADT, unless otherwise approved by the State Structures Design Engineer. See the "***Instructions for Developmental Design Standards*** " ***IDDS-20450*** : http://www.fdot.gov/roadway/DS/Dev/IDDS/IDDS-D20450.pdf
What transportation requirements and limitations do you typically anticipate on the Florida-Slab-Beam (FSB)?	Initially restricted to off-system bridges but only until we determine there are no long term maintenance issues, then we will be able to use for all bridges on the state highway system. Designed for HL-93 and FL-120 (Florida's model permit vehicle)
Please explain what limits this bridge type to local bridges.	This is currently limited to low volume or off-system bridges to allow for monitoring of the long-term performance.
What is the design service life of this bridge superstructure?	75 years.
Can the FSB be redecked?	If needed.
What type of concrete is typically being used in these bridges, and is any type of chloride penetration protection being used?	Using the FDOT Class VI (8,500 psi) concrete for the FSB's. The topping and the joints are 4,500 psi concrete with Shrinkage reducing Admixtures (SRA). For superstructures located in Extremely Aggressive environments, Supplemental Cementitious Materials are required per FDOT Specification 346 (Fly Ash, Slag, Silica Fume, Metakaolin, Ultrafine Fly Ash). No corrosion inhibitors.
What is different in FL slab beams from what might be considered typical?	There is a pocket between the beams with transverse reinforcement allowing the slabs to act as a system (emulating CIP Slab behavior), in lieu of independent beam/slab movement seen in some precast/prestressed slab systems.
Was lightweight concrete considered in this application?	No, but typically a 10% span length increase can be achieved with LWC.
Are polymers being used in the slab beams?	No.
Does FDOT use adjacent box beam bridges for short span?	No.
Why the chamfer in the top of the FSB?	The 2" chamfer improves the stress flow at the corner and reduces localized stresses and cracking. This is expected to have more benefit in a continuous span system with negative moment regions above the supports.

Slide 50 - Does FDOT have a special vehicle design load besides AASHTO standards for designing these slab-beams?	No. We also check the FL-120 for the Load Rating which is an enveloped model permit load.
Normally we do not check shear in slab bridges. The Precast/Prestressed beam section shows a significant amount of stirrups. Do we have to consider the shear reinforcement in the design of Precast/Prestressed beams or it is provided only for connection to the topping?	We always check shear for prestressed slab beams due to the reduce section depth. The shear stirrups provide a secondary function for the interface shear connection and support transverse reinforcing during casting.
Any reasons to discontinue transverse PT?	Expense, time, durability reliability, specialty subcontractors and suppliers required.
Do you think cracking would be reduced if you went back to full transverse post tensioning?	Yes, but at a significant expense and additional inspection requirements. The long-term post-tension compression force must be maintained at 200-400 psi transversely to be effective.
What is the longest span length for the FSB's?	Depends on the depth, additional composite loads, permit loading requirements, allowable sag geometry, etc.
Can the FSB's be made continuous?	There are no standard details for this, but a link slab detail is being developed. Continuity only adds about 10% to the span length capacity.
Deck Closure Joints	
Have you investigated alternative to UHPC for joints between beams?	The current system uses conventional concrete. UHPC is currently being investigated in the FDOT Research Center. Conventional grout was considered but not recommended.
Discuss the concrete specified for joints between beams? What is the strength; is this FRC; drawbacks/advantages observed, etc.	Currently specifying FDOT Class II Bridge Deck Concrete with SRA (4,500 psi) for joints and topping. Not FRC. Currently the FDOT Research Center is testing UHPC for the joints with no topping.
What kind of non-shrink grout do you use?	See FDOT Specification Section 934 (http://www.fdot.gov/programmanagement/Implemented/SpecBooks/January2018/Files/934-118.pdf), but we also have precision grout under Developmental Specification Dev934 that is recommended for PBES connections.
Full description of the UHPC, if it is a proprietary product and if so, is FDOT trying to create its own UHPC mix?	We have only used a single proprietary mix to date. A Technical Special Provision (TSP) is required for each FDOT project. FHWA is currently developing a guide specification which hopefully will allow standardization of the specification using performance based criteria. FDOT is not developing its own UHPC mix.

Can you please describe the shear mechanisms affecting the joint region between the two concrete materials?	There are protruding bars on the sides of the FSB and into the pocket. These bars are developed in the pocket with a stirrup tying the two protruding bars together. And then 4 longitudinal bars at each corner of the stirrup lock everything together. The longitudinal bars also provide some flexural resistance within that section. We also require a Saturated Surface Dry (SSD) condition to allow for better bond of the two materials.
How are you mixing?	High Energy Shear Mixer is used for UHPC.
What are the advantages of having longitudinal steel reinforcement along the UHPC connection detail? What is the recommended diameter?	It is anticipated that there will not be any longitudinal reinforcing for the UHPC connection. For the conventional concrete joint, longitudinal reinforcing anchors the corner bend of the stirrups & hooks, and helps restrain longitudinal temperature and shrinkage effects. FDOT standard detail per the Instructions for Index D20350 series are four #5 bars (see Figure 9): http://www.fdot.gov/roadway/DS/Dev/IDDS/IDDS-D20450.pdf
Are the bars in the closure pour bent after form removal?	No, the forms are slotted and sealed.
Construction	
Slide 42 - Is the crack arrest strip a proprietary material? Widely available? Requires an adhesive to hold it in place?	There are several manufacturers. This is standard precured silicone sealant that is commonly used in the precast building industry. Silicone adhesive is used to hold it in place. See FDOT Spec 932-1.4: http://www.fdot.gov/programmanagement/Implemented/SpecBooks/January2018/Files/932-118.pdf
Any attempt to use Internal Curing for the CIP deck?	Not to date, but this is something our State Materials office is looking into.
Can FSB be constructed in phases?	Yes.
The use of neoprene pads continous versus individual pads. Some drawings that we see have shown two individual pads at the end of one slab and one pad at the other end. Why not continous pads? Bearing of the decks on the pads always becomes an issue!	Two pads at one end is sometimes utilized by designers due to the perception that better contact is achieve. The reason for not using continuous strips was discussed in the video, as it relates to potential cracking on the bottom flange element, especially for skewed FSB's.
Claim history and considerations: Time, weather, material supply, holidays, traffic, etc.	No claim history.
Performance / Durability	
Address issues with spalling in the bottom of the slabs at the ends during strand release.	We did see some minor evidence of this with Orange Ave, however that project had FSB's with a 30 degree skew and the details were modified to mitigate some of this. I am not familiar with any other occurrences using these standards.

What is the typical expected maintenance-free service life? What's the work threshold of maintenance?	75 years. With a future option to use UHPC in the pockets and no cast-in-place topping, adding a future wearing surface can also be considered.
What influences your consideration to include Corrosion Resistant Materials in the project scope, and what types?	Elements located in extremely aggressive environments should consider corrosion-resistant materials, either through concrete enhancement or reinforcing material selection. ***FDOT Structures Manual - Volume 1, Table 3.5.1-1*** and ***Volume 4*** contain guidance for consideration: http://www.fdot.gov/structures/StructuresManual/CurrentRelease/StructuresManual.shtm
Has this system experienced reflective or other cracking? How many inspection intervals are recorded?	We have not seen any on the Orange Avenue project (constructed in 2014). However the FSB standards have only been implemented for about 2 years, so we don't have a significant number of bridges with this superstructure to make a final conclusion.
Do you think this particular system will perform better than past slab units? When can we use this on state highway?	Moderately. More robust joint. No specific date identified for use on SHS.
Slide 29 - you said they discontinued using PSUs due to longitudinal cracking. Were those units laid transversely, like the current ones? If so, did they determine what caused the cracking?	The Sonovoids, PSU's and FSB's are all placed longitudinally. The Sonovoids and PSU's did not have any continuous positive tension connection (rebar) between the precast units. Sonovoids only two or three PT bars; PSU's had a 6" reinforced concrete topping. Crack propagation was presumed to be a combined result of transverse shrinkage, creep, PT relaxation, and dishing of the deck which then allows some minor differential movement to occur. This can lead to breakdown of the grout integrity for Sonovoids, additional movement and deterioration of the asphalt overlay.
Cost	
Please address cost of ABC to conventional construction, as well as difficulties in design and construction.	The FSB's are currently a higher cost than casting a conventional beam-deck, specifically because they are new to contractors and precasters, and less structurally efficient than beam-deck systems but have additional time and cost savings for the contractor. With the FSBs there are some width and length limitations, so during design, the bridge geometry may be a challenge for some locations.
What is the % cost increase vs. regular construction?	While the FSB's are currently a higher cost than casting a conventional beam-deck, specifically because they are new to contractors and precasters, for one of our recent in-house project designs (Hicks Rd Project), the BDR cost analysis showed the two superstructure types were competitive.