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#	**Questions**	**Response**
1	Can you discuss recommendations and limitations related to transverse post-tensioning, constructability, and skewed bridge detailing.	AASHTO recommends 250 psi across the shear keys. Most owners do not follow this recommendation. Each owner has different requirements for this. The presentation covered the issues with transverse PT.
2	Are there any precast plants in the western states that have the casting beds for these new beams?	Most likely. Normal I beam and box beds can be used.
3	Has a traffic rail been tested while attached to one of the precast concrete deck beams? If so, how well did it perform?	No, but if an owner has a rail that is used for slab bridges or prestressed ox beams, it can be used.
4	Were Live Load deflections taken into account for the design tables?	We have moved away from design tables. This was covered in the presentation.
5	Can you elaborate on the recommended design and details for future tendons as related to the new design process.	There are no provisions for future tendons as it is a pretensioned beam.
6	Is it possible to do a partial replacement of prestressed box beams with transverse post-tensioned lateral ties?	This is not the subject for this presentation.
7	Will this prestressed system have better durability than previous systems?	Yes. This was covered in the presentation.
8	Does this system result in better durability compared to the historical grouted keys?	Yes. This was covered in the presentation.
9	Is specialized heavy equipment needed to construct this system?	No
10	How do you account for the effects of torsion on the distribution of shear between the webs, near the support?	Once the beams are connected, there is minimal torsion acting on the individual beams.
11	What beam types are incorporated in the system?	This was covered in the presentation.
12	Reflective cracking has been an issue with adjacent box beams historically, how is this being managed with the proposed design?	This was covered in the presentation.
13	What are best practices for how designers should detail the longitudinal joints that result as a product of the precast elements?	This was covered in the presentation.
14	Are there any considerations for constructability, ie. closure pours, dowel bars, etc.	This was covered in the presentation.
15	Please comment on the potential for the use of lightweight concrete in the future for precast beams.	This is not the subject of this presentation. Lightweight prestressed beams have been built in several states. It is feasible.
16	What studies can be provided on the economy of this system over conventional prestressed/precast?	No specific studies. The elimination of the typical topping slab should result in a bridge with lower comparative costs.
17	What are the cost savings with this system over conventional construction methods?	There is not a lot of data at this time. The elimination of the typical topping slab should result in a bridge with lower comparative costs. It is estimated that the fabrication of the beams is approximately 10% to 20% higher. This cost and the cost of the closure joint is offset by the elimination of the topping slab.
18	How are these prestressed concrete deck beams anticipated to perform in earthquakes?	The same as a solid slab bridge.
19	What options are available when the "deck" requires replacing?	There is no structural deck to replace. Long-term maintenance would be the same as a solid slab bridge.
20	Have prior issues been due to over sealing the keyway bottom resulting in the grout not engaging the lower shear key slopes?	We believe no. The presentation covered some of the theories on past failures. Inadequate grouting is one potential cause.
21	How do precasters maintain the integrity of the void form alignment, and how do the inspectors verify the alignment?	That is an age-old question. The voids need to be adequately anchored in the form. Fabricators have developed their own methods for anchoring the voids. This is one reason why we are proposing no voids for short spans.
22	How are discrepancies between standard details and local precaster capabilities handled?	The details presented are not standards. It is understood that minor changes to the details can be accepted by the owner. There are a few details that should not be changed. This was covered in the presentation.
23	How do you ensure correct ridability and drainage that results from the beam camber without a deck?	This was covered in the presentation.
24		
25	Thank you…can we get the recording and the handouts for this presentation ??	See the FIU webinar web page.

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26	How quickly can one of these bridges be opened, as everyone is looking for minimum roadway closure time?	The construction of these superstructures could be accomplished in as little as one week depending on the cure time for the closure joints.
27	You mentioned typical design software being capable of handling this design. Based on experience with NEXT beams and Deck Bulb Tees not all software handles this appropriately and needs to be closely checked or design conservatively. This doesn't always work with camber calculations. With this design, where the joint is a more significant portion of the dead load and design section, are you aware of efforts to bring this beam type into any software packages?	We recommend that the closure joint be treated as dead load. The stiffness and strength of the closure joint is conservatively ignored. If this approach is used, standard beam software can be used. If one wanted to account for the stiffness and strength of the closure joint, hand calculations might be necessary.
28	Can this systems be used with semi continuous structures?	Yes. You could use the same details as an adjacent box beam bridge.
29	Any particular requirements on the bearing configuration for these beams? For example, TxDOT slab beam standard shows a 3 bearing configuration (2 small bearings at one end and 1 large bearing at the other).	We recommend following state stnadards for box beam and slab bridges.
30	What is usually the driving reason to use UHPC for the joints instead of traditional concrete?	Narrower joints, higher strength connections, and durability. This needs to be weighted against the cost.
31	Is the installation of formwork below the keys an issue?	No significant issue has arisen. There are different methods that can be followed.
32	How are the bottom forms for the shear keys set in the field?	There are at least two potential methods. 1. Vertical ties in the joint that are removed after the joint sets up. 2. Allow galvanized inserts in the bottom of the beams to attach forms.
33	How do you handle transverse slope verses bearings?	The same as adjacent box beams. The beams are typically set to the cross slope of the road.
34	How is the bottom of the closure pour sealed prior to placing concrete?	We do not specify (contractor means and methods).
35	how do you form the closure over water?	You would need access under the bridge to place and remove the forms.
36	Can you please elaborate about the field poured concrete in the joints?	We suggest normal deck concrete or UHPC.
37	How many bridges have been built using this design? How are they performing?	At least 4. No issues noted.
38	What is the maximum span length (simply supported and continuous configuration) that could cover this new concept of deck slab for both roadway and railway bridges?	It should be similar to or slightly less than an adjacent box beam bridge.
39	Are there any detail to make decks continuous for live load at the pier (simple span with continuous deck)?	We suggest following state standards for adjacent box beams without a topping slab.
40	Shrinkage and creep rates will be different between the prestressed beams and the cast-in-place connections. That could lead to a tendency for longitudinal cracking. Has this been observed in the field?	No. It should behave similarly to a beam with a topping slab cast on top.
41	What would be the advantage of this design over a NEXT beam system (which seems lighter) ?	1. Longer spans are possible. 2. Cost might be lower due to the cost of the NEXT Beam form 3. Smaller cranes for erection (lighter) 4. Most likley, a thinner structure NEXT beams should still be considered if the spans are reasonable.
42	What substructures work best with this kind of superstructure approach?	These beams can work with any reasonable substructure.
43	Is there any design checks for shrinkage?	The same as any prestressed pretensioned beam.
44	What kind of rebar are you using in the shear keys? The photo looked like epoxy-coated rebar was used?	Designers should follow state standards for decks.
45	Ar MassDOT, we don't use a lot of prestressed concrete beams in MA but we do have details for NEXT beams. Do you know if these "guide details" will be added to any state standards, such as the MassDOT Bridge Manual standard details?	Details are being developed at this time.
46	Have any state DOT's approved these beams?	Most Northeast States and at least one Midwest state have allowed them. Designers should consult with the owner prior to initiating a design.
47	What methods are being considered to ensure bond between the top of the slab and the cast topping?	There is no topping proposed for these beams.
48	How would this type of bridge be widened in the future?	There are no specific details developed yet. In theory, the first joint and fascia beam could be carefully removed, taking care not to damage the projecting bars in the first interior beam. Then the new beams could be installed and connected to the remaining beams.

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49	If the bridge is in a sag curve, do the slab beams have scuppers?	The designers could follow state standards for adjacent box beams. It would be very challenging to run a scupper through the beams. I believe some states would drain the water through slots in the base of the barrier.
50	Are you aware of the work that Drs. Phares and Liu did at Iowa State University to develop a similar connection? The joint detailing is similar - however, their detail does not require holes in the beam side forms.	They shared the details with me. Interesting, and similar design. There are fewer bars in the joints. PCINE was trying to follow AASHTO requirements for distribution reinforcing for solid slab bridges (which we are emulating). This typically requires #5@6". With the long history of joint failures, we wanted to take a more conservative approach.
51	If there is no overlay, do you seal the longitudinal joint between the precast and the closure?	The same as a longitudinal stage construction joint. In the northeast, we typically use a membrane and overlay.
52	Have you seen any clever examples of form systems for the joints?	Nothing special. The cover sheet of the PCINE details shows one system. We expect to see more ideas as these beams become more common.
53	What is the minimum closure width between these beams when handling nonstandard widths that are not 4ft increment?	This is inluded in the detail sheets. It depens on the size of the bars and the type of concrete used ikn the joint.
54	What are the end connection details for integral and semi-integral abutments?	We suggest following typical details for adjacent box beam bridges.
55	Does the system improve the superstructure load rating?	The beams should be designed for an adequate load rating (state standards).
56	Are the spreadsheets available to the public?	Just for the bridge width and the live load distribution factors. They will be available soon from www.pcine.org.
57	Has the committee considered the use of 'link slabs' across the bridge at the ends of the precast beams?	Yes. We suggest investigating NYDOT standard details for UHPC link slabs.
58	Is there any cost data to be shared compared to other types of bridges?	The beams should be approximately 10% to 20% more. From there, the designer can estimate the cost of the closure joint (concrete and rebar).
59	Can the deck beam be opened for temporary traffic prior to overlay?	Yes, once the joint concrete has gained strength.
60	Is there a need for shrinkage compensating concrete mixes for the conventional longitudinal joints?	Bridges have been built with normal deck concrete. It is really no different than a topping slab. There is potential for minor shrinkage; therefore, adequate shrinkage reinforcing should be detailed to control the width of the cracks.
61	How do you see the use of variable thickness overlays on this system in terms of constructibility?	This is a standard approach in the northeast. Contractors typically place pavement wedges prior to placing the top layer of pavement.
62	How is water infiltration/seepage addressed at joints?	These are reinforced joints. No different than a stage construction joint on a decked bridge. We do recommend exposed aggregate for the sides of the joint to improve bond and performance.
63	How does phasing impact the use of this system?	There needs to be enough room to accommodate the projecting bars in the stage area. This is about 12". My experience is that the stage joint should be at least 12" to 24" to accommodate earth support systems behind the abutments.
64	How is the level of longitudinal reinforcement at the bottom of the closure pours determined? The bottom of the closure pours will be subject to tension due to longitudinal bending and do not contain the same level of primary reinforcement as the beams. A big difference between the NEXT beam connection and the connection for the deck slabs is the nuetral axis is within the depth of the connection.	We suggest that the bars be designed to meet the requirements for serviceability, similar to bars in negative moment regions of continuous girder decks.
65	How are the form side slots blocked out?	The side form has two main pieces. The shear key shape is attached to the slotted side form from the outside. During removal, the side for is detached from the shear key. The side form is removed, then the shear key pieces are slid out of the end of the beam.
66	During detensioning, the bottom flange can be damaged. What do you suggest for mitigating this damage?	Some states detail a thin foam block cast into the beam to prevent the beam from riding up on the edge during detensioning. See the MassDOT Bridge Manual for one example.