

NCDOT - G/C PCI Joint Meeting Minutes

Thursday, November 7, 2019; 1:30 pm

1. Cabell Garbee welcomed attendees to the meeting at about 1:35. A sign-in sheet was distributed. Self-introductions were made.

After introductions, the meeting was turned over to Reid Castrodale.

The following attended the meeting.

Trey Carroll	NCDOT – SMU	thcarroll1@ncdot.gov
Emmanuel Omile	NCDOT – SMU	eomile@ncdot.gov
Cabell Garbee	NCDOT – MTU	cgarbee@ncdot.gov
Jason E. Poppe	NCDOT – MTU	jepoppe@ncdot.gov
Jason Civils	NCDOT – MTU	jcivils@ncdot.gov
Tim Brandenburg	NCDOT – MTU	trbrandenburg@ncdot.gov
Bobby Watkins	NCDOT – MTU	bwatkins@ncdot.gov
Peter Finsen	G/C PCI	peter.finsen@gcpci.org
Reid Castrodale	Castrodale Engineering / G/C PCI	reid.castrodale@castrodaleengineering.com
Jeff White	Prestress of the Carolinas	jeff.white@prestressotc.com
Dale Willhite	Standard Concrete Products	dalewillhite@standardconcrete.org
Chris Arca	Coastal Precast Systems - Wilmington	carca@cpsprecast.com
Ron Thompson	Coastal Precast Systems - Wilmington	rthompson@cpsprecast.com
Mark Perkins	Florence Concrete Products	markperkinsfcp@gmail.com
Scott Hicks	Smith-Columbia Corp.	shicks@smithcolumbia.com
Travis Overcash	Utility Precast Inc.	utilityprecast@hotmail.com

2. Approval of minutes of March 27, 2019 Meeting.

Minutes were distributed prior to the meeting, although a draft had been prepared shortly after the meeting. Minutes and other handout information can be accessed on the G/C PCI website: www.gcpci.org. The draft minutes were approved as distributed.

3. Old Business

- a. Technical Committee Meeting

Minutes from the Technical Committee Meeting on July 11, 2019 were distributed for information. Approval of the minutes will be handled at the next Technical Committee Meeting. A few items were on the agenda for discussion.

- 1) Stressing strands in draped position

Trey Carroll indicated that the Department was open to stressing strands in the draped position. They would like to see this used on some projects to demonstrate its application. He asked producers to contact him to discuss if they wanted to use this on a project. Current policy limits stressing strands in the draped position to set ups with two girders in the bed. Changes to policy may be considered after they observe some uses of the procedure. Keep this topic on the agenda for the next meeting.

2) Overlays & barrier rails for cored slabs and box beams

Cabell Garbee indicated that Aaron Earwood would have liked to attend the meeting but was not able to do so. Cabell then related how these topics had been discussed with the contractors and precasters. He felt that the situation of adjusting barrier rail bars when beams are on heavy superelevation can be handled either by the plant or contractor, and that additional bars for overlays were not required. He recommended that these topics be deleted from future agendas.

3) Availability of prestressed elements

Cabell Garbee indicated this item is now better understood by the contractors and can be dropped from future agendas. Reid Castrodale mentioned that there was a related action item where Todd Whittington was going to look into the possibility of a presentation by G/C PCI on this topic that would be presented at the construction conferences. Cabell indicated that he would remind Todd of this item.

b. RFID/Barcode Information

Bobby Watkins distributed a handout with updated RFID / barcode locations for prestressed concrete members. The only change was for bulb-tees and FIBs where the location is on the bottom of the top flange 5 ft from the marked end. Cabell Garbee reported that this was to make it easier for inspectors to access the tags, especially when the product was on a truck. Bobby also reported that they are slowly separating their inspection from Idencia. They are moving to having data entry directly into the new HiCAMS portal. The new system should be in place by the beginning to 2020, after a delay due to various IT issues. Idencia can still be used by producers. The Department is looking for new sources for tags to avoid the sole source issues.

c. Top Strand Details and Notes

Reid Castrodale reported that he just sent some information to Trey earlier in the week. G/C PCI has not yet developed a proposal. Trey reported they are open to the idea but have not been seeing it on design/build projects. They expect that this will be part of their lateral stability policy.

Chris Arca indicated that they had seen some recent designs with 3/8 in. strands in the top flange. He would rather be able to use 0.6 in. strands than to have to inventory another size of strands. This is from the FIB standards which show a smaller strand. Jeff White indicated that NCDOT standards do not include top strands, but the producers would like to see it added to the standards since they are needed to tie reinforcement. SCDOT and GDOT include top strands in their standards. Since top strands may be slack, it does not matter what size the strands are.

d. Status of FIB Use

Trey Carroll reported that the development of their standard plans for FIBs is still a work in process. They hope it will be available by the beginning of the year. The Department has been waiting to get the Harkers Island plans out before the FIB standards were finalized. The plans for the project should be completed by early next year, and then they plan to move on to working on the FIB details. The project is scheduled for the April 2020 letting.

Chris Arca would like to see standards for bearing plates because he is seeing great variability in bearing plates, even within the same design/build project. He has contacted contractors asking them to direct the designers to use standard plates. Chris agreed to send a plate detail to Trey.

Fabricators are also seeing confinement (doghouse) bars being required for the full length of the FIBs, which is the FDOT standard. Designers are reluctant to deviate from the FDOT standards, although they are using different strand patterns. Trey reported that he had reached out to FDOT to ask their reason for

using the full length doghouse bars, and he indicated they said it was to provide some reinforcement in case they ever needed to do some maintenance on the girder.

Fabricators are also seeing varying strand patterns – some with 1 strand in the web and some with 2. There was also some variation in strand locations in the top flange which is problematic when steel headers are used. Jeff White suggested that the top flange detailing being used in the MBT standards was working well and should be used in the NCDOT FIB details.

e. Web Splitting – Debonding Quantity

Reid Castrodale indicated he has not looked at the structural effect of the NCDOT policy of using 50% debonding if web splitting occurs.

It was confirmed that silane sealing is the current practice to address web splitting. No further discussion is required regarding silane sealing.

There was discussion about how, with the large number of debonded strands now being used in designs, it can be difficult for plant personnel to access the strand locations to apply the debonding or to tape the ends of the debonding. It would be easier for the plant workers if debonded strands are placed out near the edges where they can be more readily accessed. The workers are also getting a lot of wire tie cuts when trying to install debonding. The Department also indicated it is difficult to inspect the debonding.

Reid Castrodale mentioned that the new debonding requirements have provisions that do not allow debonding to be placed under the web, which can help with not allowing strands in that difficult to reach area. However, he thinks that clarification is needed for this and several other provisions that are not very clear. He has brought these items to the attention of the AASHTO committee. The new provisions are based on some research. These concerns could be sent to NCDOT which could then send them to AASHTO if they agree with the items.

f. Welded Wire Reinforcement Standards

Jeff White mentioned that he had send the NCDOT end zone reinforcement details to a wire reinforcement supplier to see if they could make the material. They came back with the question of whether the substitution would be based on equal area or equal force (using the higher strength in the wire reinforcement which is allowed by AASHTO). It was discussed that standard end zone details are required for wire reinforcement to make sense. The FDOT approach where the standard end zone details can be used up to a certain number of strands; above that number, the designer must check the design and detail additional reinforcement that can be added to the standard detail to satisfy the design requirements. Trey Carroll indicated that the intent of the current standard details for end zone reinforcement is that they would be standard for the majority of designs. Guidance needs to be given to designers so that if they need additional reinforcement, then it should be added to the standard reinforcement details. For design/build projects, the teams do not follow the bridge design manual.

The wire supplier has offered to give a presentation. They should work up equal area and equal force solutions, because the Department will have to consider whether they will allow the equal force details based on the higher strength of the wire. It appears that reinforcement for end zone splitting should continue to be designed using current provisions with a specified working stress, which would not utilize the higher strength reinforcement. However, for stirrups, the higher strength of the reinforcement should be able to be used, as allowed by the AASHTO LRFD Specs. It was pointed out that the steel used for the wire reinforcement would all be high strength material, but the higher strength would only be considered for the design for shear reinforcement.

g. Lateral Stability of Girders – Status of NCDOT design program and policy

Reid Castrodale reported that PCI still has not completed their lateral stability spreadsheet, although it is in the final stages of approval. He agreed to send Trey the draft version that he currently has, with the understanding that it is still a draft.

Trey Carroll asked about what GDOT and SCDOT are doing. The approach taken by GDOT was to provide a table with maximum spans for each girder size; lateral stability is acceptable for girders up to the span lengths given in the table, but needs to be evaluated for girders that exceed the lengths given in the table. These maximum spans were introduced after GDOT had seen some very long girders in a design/build project that they were not comfortable with. The table, which is taken from the GDOT *Bridge and Structures Design Manual*, Rev. 2.7, dated August 10, 2018, is reproduced here:

3.4.2.8 Beam Lengths

The maximum beam lengths for the PSC beams are:

- 50 feet for AASHTO Type I Mod. beams
- 65 feet for AASHTO Type II beams
- 85 feet for AASHTO Type III beams
- 125 feet for 54" Bulb Tee beams
- 135 feet for 63" Bulb Tee beams
- 150 feet for 72" and 74" Bulb Tee beams

AASHTO Type II beams are preferred for span lengths between 40 to 50 feet.

If the above maximum beam lengths are exceeded under an alternate bidding process, the engineer of record is responsible for performing a beam stability analysis.

The maximum beam length limits that appear in the table above were computed using the assumption that the beam is lifted at 1.5 x the beam height from the end of the beam.

Trey felt that some of the span lengths given in the GDOT table may have been a bit long. He asked if the fabricators were comfortable with the lengths. Fabricators agreed to look at the GDOT list to come up with their own recommended maximum spans before lateral stability analyses would be required.

h. Field review of girders with vertical cracking using information from NCRs

Cabell Garbee indicated that he had received from fabricators several NCRs for girders with vertical cracks that were accepted and put in service. They were also going to look through some of their own records to see if they can find some more girders. Greg Lucier at NCSU has submitted a research topic for looking at vertical cracks in girders. Fabricators were asked to submit any additional NCRs for cracked girders by December 31. Trey suggested that PCI could add some money to the project which could help as it will be competing for limited funds from the Department. The proposal is due November 15 with selection in the Spring and work to begin in August. Several other research topics were discussed including an evaluation of the girders and materials from the old Oregon Inlet Bridge as it is taken out of service.

i. Standard repair procedures

Jason Poppe reported that 4 or 5 standardized repair procedures have been received from the Structural Management Unit. They have been provided to the inspectors, but have not been posted on the website, although they could be. Jason agreed to send copies to G/C PCI.

j. Standard operating procedures

Jason Poppe said that they were cleaning up the final draft of the standard operating procedures. When it is completed, he will send a copy to Peter Finsen. The intent of the SOP is to provide a framework for consistency among inspectors. They expect that it will be posted on the website. The document is based on the NCDOT Standard Specifications and resources from other sources, like PCI.

k. Using strands for continuous for live load connections

The fabricators would like to have a strand detail as an option for providing the continuity connection detail. There were some concerns expressed about how to replace a strand that may be accidentally cut off in the plant. Trey Carroll asked if the strands can be bent to provide a similar connection within the same size of diaphragm. The detail has been used successfully by other states. Using strands for the connection will eliminate the added bars which should allow better consolidation of the concrete in the bearing area of the girder. But there may still be times when a fabricator may want to use the current mild reinforcement detail.

l. Full-length debonding of strands (general note for girders)

Reid Castrodale had sent Trey Carroll a proposed plan sheet note and some other information earlier in the week. The Department was already working on a plan note for their standard girder plan sheet that will allow full-length debonding as a strand pattern option; it should be added soon. This item should stay on the agenda until it is fully implemented.

m. Silane sealer for vertical cracks prior to detensioning

Fabricators had requested that vertical cracks prior to detensioning could be sealed with silane rather than water cured for 7 days. There was question about whether the girders will have a uniform rubbed finish when silane has been applied at the crack locations. It was agreed that a girder will be identified to which silane can be applied prior to rubbing, to determine whether the finish is similar to the remainder of the girder without silane. The test section would not have to be at a crack.

The larger question is whether the Department would allow silane sealing instead of water curing where vertical cracks have occurred. The Department will consider this possibility.

n. High flow/SCC mixes

Cabell Garbee noted that the mix design workshop was very good. He still intends to get his inspectors to be ACI certified for SCC mixes, but has not been able to get this done yet. The Department is still considering what tests will be required for high flow mixes. They plan to go to some precasters and try the SCC tests on high flow mixes and see what test methods they want to use moving forward. They are considering testing spread rather than slump, and that they may not rod cylinders for the high flow mixes. This work will give them a basis upon which they can base specifications and approval limits. High flow mixes are not yet in the SOP but will be added when the work is complete.

4. New Business

Early Payment for Materials

Peter Finsen raised the question that was coming from Joe Rose regarding payment for completed product. Chris Arca explained some of the issues where the Department may be holding payment for some product because, for example, all of the girders in a span, or all of the piles in a group, have not been approved. This makes the business end of prestressed concrete production difficult. The more quickly they can get paid for completed product, the better. So they are asking for clarification of the rules for payment.

Cabell Garbee described the situation from their perspective and noted that Jason Poppe had sent out a related memo addressing some products, but not piles. The Department understands the financial situation and will work with producers when needed to move payment forward. Some of the problem earlier was that the Idencia and HiCAMS system placed items on the same FIR, while now a separate FIR is produced for each item, so each item can be considered individually. However, the Department would like to see some grouping so that elements are not handled one at a time, or in small groups, which becomes less efficient for them. The Department likes to see product completed and ready to ship so payment can be made, even if it sits on the yard. However, they would like to avoid the rush to get approval just prior to shipment. The situation is further complicated when there is an issue with an element that must be addressed by SMU prior to shipment. Jason indicated that he still needs to send out an updated memo about payment for piles. Having the procedure documented will certainly help.

Jeff White reported that his plant has not been having problems with approvals, but rather getting payment from the contractors. The new system has now streamlined the identification of items ready for payment, but the contractor's payment process has not gotten any faster. Cabell explained that the estimate from the resident engineer is only submitted once a month for each project, although they can force faster payment in some cases. But then the contractor has to be paid. If there are issues with the contractor not paying the fabricators promptly, they are encouraged to let the resident engineer know.

Elimination of ½ in. Strand from Pile Standards

Trey Carroll indicated that the Geotechnical Unit had requested elimination of ½ in. strand from the pile standards. They feel that the allowable driving stresses for piles with ½ in. strand are at a significant disadvantage. Chris Arca indicated that they are used to bidding them with ½ in. strand so would not want it to be changed after bid. Cabell stated that if the standard is changed, then the fabricator will know what is expected when they bid. The fabricators agreed that as long as the strand size is known at bid, then they are fine with eliminating the ½ in. strand option on the pile standards. The new standards would probably show up in lettings early in 2020.

Changing Cored Slab Design from ½ in. to 0.6 in. strand

Travis Overcash brought up that he recently got a cored slab project which had ½ in. strands, which he did not find prior to the bid. It was a metric project designed in 1999 that had an addendum added after bid that provided the conversion to customary units. He did get the issue worked out, although he still has to build it in metric.

5. Project Update

Trey Carroll provided an update, indicating that the lettings should pick back up by March or April, when the cash flow should be worked out. He thinks that things should settle down by the beginning of the year. Cabell thinks that the division work will follow the other work as they get it all figured out. Keep looking at the letting list – they keep it updated.

Peter asked about when the decision is made, and by whom, regarding the material used for a bridge, as he had driven under a new steel bridge being built out by the airport. Trey Carroll indicated that concrete is still their first choice for material, but that the prime contractor usually makes the choice.

6. Action Items: (New items are listed first in italics)

- a. *Chris Arca agreed to send bearing plate detail for FIBs to Trey Carroll.*
- b. *G/C PCI to arrange for a presentation by a wire reinforcement supplier at upcoming meeting. They should look at the end zone reinforcement details considering both equal area and equal force designs.*
- c. *Reid Castrodale to send Trey Carroll the draft PCI lateral stability spreadsheet.*

Technical Committee Meeting & Tasks

Next Meeting: July 16, 2020 at 1:30pm at NCDOT - SMU

Ongoing tasks for the Technical Committee:

- a. Temporary top strands
- b. Lateral stability
- c. Stressing strands in draped position
- d. Full-length debonding of strands (general notes for girders)
- e. FIBs
- f. Standard repair procedures
- g. Standard operating procedures
- h. Standard welded wire reinforcement option for girders
- i. Use of strands for continuity connection detail
- j. Vertical cracking inspection and marking