NCDOT - G/C PCI Joint Meeting Minutes

Thursday, November 15, 2018; 1:30pm
Wake Tech Campus

1. Chair Cabell Garbee called meeting to order at 1:45. He welcomed attendees. Self-introductions were made.

   The following attended the meeting.

Gichuru Muchane	NCDOT – SMU	gmuchane@ncdot.gov
Madonna Rorie	NCDOT – SMU	mrorie@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
Aaron Earwood	NCDOT – Construction	aearwood@ncdot.gov
Peter Finsen	G/C PCI	peter.finsen@gcpci.org
Jeff White	Prestress of the Carolinas	jeff.white@prestressotc.com
Reid Castrodale	Castrodale Engineering / G/C PCI	reid.castrodale@castrodaleengineering.com
Joe Rose	Coastal Precast Systems	joe@cpsprecast.com
Gary Shrieves	Coastal Precast Systems	gshrieves@cpsprecast.com
Ashley Smith	Smith-Midland	asmith@smithmidland.com
Roderick Smith	Smith-Midland	rsmith@smith-carolina.com
J. R. Parimuha	Florence Concrete Products	jrparimuha@yahoo.com
Rick Merritt	Ross Prestress	rmerritt@rossprestress.com
Richard Potts	Standard Concrete Products	rpotts@standardconcrete.org
Jesus Marin	Standard Concrete Products	jesusmarin@standardconcrete.org
Dale Willhite	Standard Concrete Products	dalewillhite@standardconcrete.org
Fletcher Smith	Standard Concrete Products	fsmith@standardconcrete.org

2. Approval of last meeting minutes. The minutes of the March 29, 2018, meeting were approved as submitted.

3. Old Business

   a. Debrief – Prestressed Concrete Bridge Design Seminar (Nov. 14, 2018)

      There was general discussion with positive feedback. Cabell Garbee noted that he had heard positive feedback and that the panel discussion was good, with good questions from the audience. Jason Poppe noted that the discussion of finishing was good. None of those attending the meeting from the SMU had attended the seminar. Peter Finsen reported that 140 attended, which set a record for G/C PCI seminars.

   b. Debrief – NCDOT Inspectors Workshop (Nov. 15, 2018)

      Cabell Garbee expressed appreciation for the workshop. Peter Finsen explained how the timing worked well since JP Binard had just been tasked with updating the repair manual when Peter had approached William Nickas at PCI regarding developing the workshop. Joe Rose suggested that after industry works with NCDOT to develop standardized repair procedures, the procedures need to be presented to the CE&I inspectors so they are also understand what is expected. Cabell Garbee responded that the Department is working on a multi-prong approach. Initially, they plan to continue development of standard

repair procedures for smaller issues. Sherry is looking at NCRs that keep coming in and are well understood so these could be standardized and not require submittals and reviews that are time consuming. This would free reviewers to deal with issues that may require immediate attention.

Cabell Garbee went on to point out that there may be projects that require a higher level of aesthetic treatment due to their exposure, when compared to other projects. The Bonner Bridge is an example where all girders may need to be held to a higher standard than for most other bridges. Peter Finsen pointed out that architectural concrete specifications require inspection from 20 ft away rather than being examined closely, as is typically happening with girders. Cabell requested photographs to be used as examples of the good, bad, and ugly; before and after repairs, and even well after the repair, since the color can sometimes change. This will help them to consistently explain what is acceptable during inspector training. Cabell would like to be able to get all CE&I inspectors in a room at one time, but that means none will be in plants. Therefore, they plan to hold multiple training sessions for inspectors.

Jason Poppe then pointed out that they are developing a standard operating procedure which should help with DOT and CE&I inspectors since it will define the Department's expectations. Jeff White offered his plant, and expected others would as well, as a location for training to allow the trainees to be able to go out on the plant to see what is expected. Cabell appreciated the idea of regional training locations that could include a plant rather than bringing everyone to Raleigh. He still needs photos to use in the training.

Tim Brandenburg said when standard repair procedures are used, inspectors will still need to document the repair with an NCR and observe the approved procedure being performed so that a complete record of the NCR and repair, including photos, is documented.

Peter Finsen brought up the subitem for this agenda item that had been proposed by Jeff White, which was: Inspections, standard NCR and associated repair procedure. Jeff's suggestion was to review NCRs to identify girders that had vertical cracking prior to detensioning, and then to go to the field to inspect those girders to see how they had performed. This would allow an evaluation of whether the effort being taken to document the cracking was of value. Jeff related a conversation that he had had with Brian Hanks about the possibility of removing the specifications on vertical cracking prior to detensioning. As a starting point, Jeff suggested that girders be identified with vertical cracking, and then the crack locations could be examined during the biannual inspections. This would provide an opportunity to evaluate the significance of the cracking. To accomplish this, each plant would collect past NCRs for this type of cracking and provide them to the Department for evaluation at the next scheduled inspection of the bridge. Cabell thought that this would be a good idea, so he asked that plants identify girders for which NCRs were prepared so they can pass the information to the bridge inspectors. It was agreed that girders in bridges that are exposed to heavy traffic and severe environmental conditions should be targeted. It was noted that the NCRs will soon be on SharePoint so they will be available for inspectors, which will be helpful if the inspectors find any cracks in the field. It was also pointed out that the girders with vertical cracks that were used and can be inspected were not the worst cases which were rejected.

Jason Civil recommended that plant inspectors mark crack locations with a paint stick so it would be permanently identified for future observation. This could be done after detensioning. Some concerns were expressed about marking cracks permanently, so the Department will discuss the idea of permanent crack marking – whether it was necessary to mark (or could just be noted in documentation) and how it could be done without leaving major marks. It was also noted that inspectors would be instructed to be ready to inspect girders as soon as the forms are removed or rolled back.

This item was referred to the Technical Committee for consideration.

c. Debrief – NCDOT–AGC Bridge Subcommittee – G/C PCI forum on project delivery (April 11, 2018)

Cabell Garbee mentioned that there has been an AGC meeting since the forum, and that he did not recall any further discussion at that meeting related to delivery of prestressed girders. Cabell and Peter Finsen then restated some of the points discussed at the forum, which included Cabell's impression that

contractors did not understand that the number of trucks is limited and that they may be committed to other deliveries if the delivery date has to be pushed for weather or other reasons; the perceptions of problems with delivery differed with contractors thinking that prestressers were not delivering on time, but prestressers thinking that they were not being given adequate lead time by the contractors for procuring materials and fabrication; prestressers also feel they are asked to produce for a certain delivery date, but then they end up storing the girders for months. Jeff White noted that lately, several large design/build projects come out at once, and prestressers have to bid them all, but never know how that will work out. It was pointed out that the date of availability may not be far enough out so there are problems for contractors as well. But floating availability dates are difficult for field inspection staff to deal with. The Department will continue to hear input and seek opportunities to improve the situation. It would help if contractors would keep prestressers informed about progress of projects. Contractors often want the product made in advance so they can call for it when convenient for them. The Department feels that the forum provided some useful dialog.

Peter Finsen expressed disappointment that no contractors attended the design seminar. With the many design/build projects being let, it would seem that they should be interested in learning more. Another approach would be for G/C PCI to get involved with the contractors' seminars. The Department could possibly reach out to encourage contractors to attend. The Department has a joint conference with AGC every other year; the next joint conference will be early in 2020 at multiple locations. In 2019, the Department has its own construction conference. AGC also has its own conference.

d. Technical Committee Minutes (July 12, 2018)

Minutes for the technical committee meeting were distributed. Reid Castrodale briefly reviewed the minutes.

e. RFID/Barcode Information

Cabell Garbee reported that the Department's IT folks are developing a system to receive data from the plants directly into DOT servers rather than going through Idencia. This means that the Department will have control of the data. They are working to push the data back out so plants can see if the data has been properly received shortly after it is entered. The new system should start up in December.

Cabell Garbee also discussed the tags, which are patented by Idencia. They talked to Idencia about tags for pipe and for signs and plastic items and were told that development of the new tags would take 6 months, but it has already been 8 months. The Department then contacted a tag producer located in Greensboro to explore development of the new tags. So there may be an alternate source for tags in the near future. Legal issues are being addressed so he could not say more.

Cabell then discussed scanner technology. The initial scanners were large and expensive, but now they are much smaller and less expensive. The optical bar-code can be read by a phone. The Department is working on a cell-phone app that can be used instead of the tablet.

f. Top Strand Details and Notes

Gichuru Muchane reported that there has been no movement. They are discussing these details with GDOT to develop a coordinated approach. Several concerns were discussed, including who will do the detensioning; how will the contractor personnel be trained to detension strands; and whether reinforcement should be provided at the end of the debonding, such as a small piece of wire mesh, to control potential cracking.

Jason Civil reported that four temporary top strands were used on girders for the Wilmington Bypass and that their use was successful. There were no camber issues with those girders.

Richard Potts said that temporary top strands are being used a lot in Florida – he will send details to the Department. Coastal Precast will also send Gichuru details from Wilmington Bypass.

Jeff White pointed out that using top strands in the design is essentially free since they are already being used for tying stirrups but are not fully tensioned. There was additional discussion about details related to temporary top strands.

g. Status of FIB Use

Gichuru Muchane reported that draft standards are still in the works for FIB girders. The Department is designing the Harkers Island Bridge in-house using FIBs, which will bid next year. They plan to wait to issue the FIB standards until after that project is let. There was discussion about whether the FIB strand pattern should use 2 strands in the web, or a column of strands on the centerline, as is used in the FDOT standards. It was noted that the centered column of strands provides more cover. The Department currently allows design/build project teams to use either strand layout.

h. Web Splitting – Debonding Quantity and Silane Sealing

Reid Castrodale expressed concern about the current policy of using 50% debonding if web splitting occurs. Gichuru Muchane indicated that he thinks they will have to revisit this now that girder designs are being pushed to the limits. They have not looked at the structural effects of the debonding in the past. The predominant use of draped strands in the past may have kept problems from occurring, although it was pointed out that we don't see girders loaded to the strength limit state so problems would not be expected in the field. Concerns about development of stirrups into the bottom flange were discussed, especially for stirrups without bottom hooks. Ricky Merritt indicated that they had still seen web splitting even with bottom hooks. It was also pointed out that web splitting is often not observed until several weeks after casting the girders, at which time the casting of all similar girders has usually been completed, so there would be no opportunity to add debonding to control web splitting.

i. Welded Wire Reinforcement Standards

Gichuru Muchane indicated that they have not looked at developing standard welded wire reinforcing details, but they have allowed it occasionally. Jeff White suggested that the Department develop standard end zone reinforcement details that would be used for all girders of a certain shape; if needed, extra bars could be tied in. It was suggested that the welded wire panels could be established as the minimum requirement and could be used by consultant designers. Welded-wire fabricators would then know that certain types of sheets would be required, and they could be set up to manufacture those sheets. The effort required for inspection would also be greatly reduced. This would address the problem with earlier use of welded wire which was a supply issue – every job had different details and were custom items, so it was difficult to get the sheets fabricated.

Cabell Garbee said that inspectors are already familiar with inspecting welded wire reinforcement, so he sees it as a design issue. It would be most desirable to have standard welded wire sheets at the ends, but it could also be tied as loose pieces. FDOT standards currently show both welded wire and loose rebar standard details, leaving the decision to using welded wire to the fabricator. Loose bars would be tied in as needed.

Jeff White reported that during the recent PCI Productivity Tour he saw a prestresser in MN that was prefabricating loose web reinforcement into panels. They had trailers of the standard panels fabricated and ready to be set into the forms. In this case, using loose bars allowed fabrication of the panels to be done on rainy days to better utilize workers. Having prefabricated web reinforcement panels (either welded wire or loose bars) would also allow inspection of the reinforcement prior to installation in the forms. This item was referred to the Technical Committee.

j. Reduced Rubbing of Girders

Item had already been discussed. Cabell Garbee requested that fabricators provide photos for training.

k. Lateral Stability of Girders – Status of NCDOT Program and Policy

The Department is working on this and plans to coordinate their provisions with GDOT. This is a good topic for consideration by the PCEF Committee.

4. New Business

a. Using strands for continuous for live load connections

From the discussions at the seminar, this item was of interest. The Department details currently show only rebar details for the connection. Joe Rose asked that this option be considered further because of situations where the bottom flange is full of strands and when the continuity rebar is added, it is difficult to get the concrete properly consolidated in the end of the girder. Recommend using this as an alternate. This is a topic for discussion by the Technical Committee.

b. Full-length debonding of strands

JR Parimuha gave an example for the I-77 project where a bridge had five girders each with a different strand pattern and they were able to use full-length debonding to combine casting of several girders. It would be helpful for fabricators to have a policy so the Department could take advantage of potential savings when full-length debonding is allowed, which is currently possible for cored slabs and box beams. Without a policy in place, fabricators must bid a project as designed and cannot bid using full-length strand debonding. A general note could be added to the plans similar to the current cored slab and box beam notes; however, these notes are specific and apply to strands identified on the standard sheets. Jeff White pointed out that the Department cannot answer questions about whether full-length debonding will be allowed if the project is out to bid, so the policy must be known prior to bid. Gichuru Muchane said that they need to have an internal discussion of the topic to determine a way forward.

c. Allow silane application rather than wet cure for girders with vertical cracks prior to detensioning

Gary Shrieves asked that treatment with silane be considered for a girder which has vertical cracks that are less than 0.005 in. [prior to detensioning] which require wet curing by the specifications (1078-12). Silane is currently an option for cracks wider than 0.005 in. [from web splitting provisions (1078-13)], so it was suggested that it should also be an acceptable option for narrower cracks in lieu of wet curing. The wet curing can cause issues with the delivery schedule. There was discussion of the point of the water curing and how it may contribute to autogenous curing. Cabell suggested that while external curing water may not get into the crack, it would keep the concrete from drying. Others suggested that the silane could retard the escape of water from the concrete, which would therefore improve the internal curing conditions. Cabell noted that when the lab has looked at air content evaluations for other types of concrete, they also look at cracks and they have not observed healing. However, the other products likely don't have the same low w/cm as is used for prestressed concrete girders. The Department will discuss this further and will consider adding this to the standard operating procedure.

d. Cored slab project with 45 degree skew

JR Parimuha pointed out that they have recently seen two cored slabs projects with 45 degree skews. This is a cause for concern for several reasons. The projects are in Edgecombe County (DD00260), with 3-60 ft spans, and North Hampton County (DA00393), with 60 and 65 ft spans. The slabs have a fair amount of camber. JR said that they were planning to block out under the slab to prevent cracking at release. Richard Potts indicated that the camber combined with any grade on the slab can cause the bearing pad to fail in compression. The slab will also tend to rock when placed on bearings. Three pads can be used to help the rocking. The fabricators will try to find details for skewed slabs using three pads.

5. Project Update –

   No project update was given. Chris Peoples had given a brief update at the seminar. Cabell said they could email the current list. He also said that they are still getting funding and are still putting out jobs. They are starting the I-95 project. Cabell was not aware of any projects that had been delayed. Mid-Currituck is still in environmental review.

6. Action Items:

   a. G/C PCI members to provide NCDOT (Cabell Garbee) photos of surface finish of girders before and after rubbing. [3b, 3j]

   b. G/C PCI members to provide NCDOT (Cabell Garbee) photos before and after of girder repairs. [3b]

   c. G/C PCI members to collect NCRs for girders with vertical cracking prior to detensioning that have been accepted for use; forward to Cabell Garbee for inspectors to evaluate during regular inspections. [3b]

   d. NCDOT to instruct inspectors to view girders as soon as form removed. [3b]

   e. Richard Potts to provide NCDOT SMU with temporary top strand details used by FDOT. [3f]

   f. Joe Rose to provide NCDOT SMU with temporary top strand details used on Wilmington Bypass. [3f]

   g. G/C PCI and NCDOT to evaluate effect of 50% debonding on longitudinal reinforcement requirement. [3h]

   h. NCDOT to discuss general note/provisions for full-length debonding of strands. [4b]

   i. NCDOT to consider including use of silane instead of wet curing for vertical cracks less than 0.005 in. in the standard operating procedure. [4c]

   j. G/C PCI members to try to find details using three bearings for skewed cored slabs and box beams. [4d]

   k. G/C PCI to identify issues or limits related to lateral stability, including the location of lifting loops. (Carry over) [3k]

   l. Gichuru Muchane agreed to reach out to Maintenance and Construction regarding attending meetings

   Cabell Garbee will identify contacts for NCDOT and will provide a list of contacts to Peter Finsen for future meetings. (Carry over)

   m. Reid Castrodale to prepare minutes from meeting

7. Technical Committee Meeting & Tasks Next Meeting: July 11, 2019 at 1:30pm at NCDOT - SMU

   The following additional tasks were identified for the Technical Committee:

   a. Vertical cracking inspection and marking. [3b]

   b. Evaluation of aesthetic quality of finish on girders – consider at 20 ft as for architectural concrete [3b]

   c. Standard repair procedures. [3b]

   d. Standard operating procedures. [3b]

   e. Standard welded wire reinforcement option for girders. [3i]

   f. Use of strands for continuity connection detail. [4a]

   Ongoing tasks for the Technical Committee:

   a. Temporary top strands

   b. Lateral stability

   c. Stressing strands in draped position

   d. FIBs

e. RFID tag placement

f. Rubbing girders

g. Cored slabs and box beams with overlays – projecting bars for composite action

h. Barrier rails for cored slabs and box beams with overlays

i. Bearing details for skewed cored slabs and box beams

j. Availability of prestressed concrete elements -

8. Next Joint Meetings: July 11, 2019, 1:30 at NCDOT SMU (Technical Committee)
November 14, 2019, 1:30pm at NCDOT MTU
March 26, 2020, 1:30pm at NCDOT MTU

9. PCEF Meetings: Last Meeting: February 7, 2019, 10 am – 4 pm (Raleigh, NC)
Next Meetings: August 15, 2019, 10 am – 4 pm (Columbia, SC)
February 9, 2020, 10 am – 4 pm (Atlanta, GA)

10. Adjournment – 3:55 pm