Georgia/Carolinas PCEF Committee Meeting #20

GDOT, Atlanta, GA

February 8, 2018

MINUTES

1. Welcome & Introductions

At 10:00 AM, Committee chair Reid Castrodale began the meeting by welcoming those present and attending by phone. He acknowledged Romeo Garcia from FHWA who has agreed to serve as co-chair. Self-introductions were made by the attendees in the room and those who joined remotely via GoToMeeting. A sign in sheet was circulated. (Attendee list is attached.)

2. Review & Approval of Minutes – August 17, 2017 Meeting at SCDOT

A motion was made and seconded to approve the minutes with two editorial corrections. Passed.

3. Review of Agenda

The agenda for the meeting was reviewed.

Aly Hussein questioned the minutes indicating that the next meeting would be at SCDOT. Reid Castrodale reviewed the decision at the last meeting that the committee wanted one face to face meeting each year. This is currently only practical in Columbia, so it was agreed to hold summer meetings in Columbia but alternate between GA and NC for the meetings in February.

It was suggested that the topic of full-length debonding of strands be discussed, which can be used to mix strand patterns on the bed, possibly to become a topic also on future agendas. Top strand debonding was also suggested as a topic. The new silica requirements will also be discussed.

The meeting agenda, minutes, presentations and other documents will be posted on the G/C PCI website at: http://www.gcpci.org/index.cfm/technical/pcef.

4. Informational – Updates from FHWA, SCDOT, GDOT, NCDOT, PCI & G/C PCI

Each agency and organization attending gave an update:

FHWA – Romeo Garcia gave the FHWA update using some slides which have been posted on the website. In the update, he discussed the NHI Bridge Construction Inspector training, a bridge bundling guidebook (Bill DuVall had been interviewed, and SC was to be interviewed very soon), specifications for full-depth precast deck panels, several training modules developed by PCI, some post-tensioning related resources, and results of a domestic scan on creating and maintaining construction inspection competence (the report is available at www.domesticscan.org). Regarding full-depth deck panels, Romeo was especially interested in guidance about acceptable quantity and widths of cracks and methods for repair. Bill DuVall indicated that GDOT has no specific criteria regarding quantity and size of cracks. DOTs have an opportunity to get a project with electronically isolated tendons (EIT) where FHWA will fund delta costs for this technology. The technology is currently being used for a project in PA.

GDOT – Bill DuVall reported that they are considering use of Florida I-Beams (FIBs) and are working toward how to use them. They are currently designing a project with FIBs that should come out later this year. Several design/build projects have already used FIBs, so they will not prevent their use. He described a recent project where they allowed, although reluctantly, top strand debonding in the shop drawings to address handling stresses. The design camber was 3.5 in., but after the top strands were detensioned, there was only 1 in. of camber. This was a problem because the girder was expected to have a negative camber (maybe 2 in.) after the deck was placed, which may make an issue for vertical clearance. Brian Hanks mentioned that they had a similar situation for a bridge and have been monitoring the bridge, so they will have documentation of the negative camber if future concerns are raised.

The discussion moved into camber prediction, where Brian mentioned the camber program that is now being used which seems to be working well since they have not received notice from the Construction Unit that cambers are out of range with the predicted values. The program adjusts both the modulus of elasticity (85% of expected) and the concrete strength (120% of specified), based on the data collected during development of the program; these factors apply to all plants and all types of sections. NCDOT policy requires that the program be used for computing camber. The program and Dr. Zia's report are available on the NCDOT website. [links provided below]

Link to the NCSU research report:

https://connect.ncdot.gov/resources/Structures/Documents/NCSU%20Final%20Report%20-%20Predicting%20Camber.pdf

Link to the camber spreadsheet (requests a login to Connect NCDOT, but it is not required):

https://connect.ncdot.gov/resources/Structures/Documents/Prestressed%20Concrete%20Girders%20-%20Refined%20Method%20for%20Camber.xlsx

Link to NCDOT Policy Memo "Predicting Camber for Prestressed Concrete Girders, Cored Slabs and Box Beams"

https://connect.ncdot.gov/resources/Structures/Stucture%20Spec%20Memos/Predicting%20Camber%20for%20PCGs,%20CSs,%20and%20BBs.pdf

Bill DuVall mentioned that they are requiring a minimum 500 psi difference between the minimum specified concrete compressive strength at transfer and the strength at 28-days. They have had maximum span length requirements for girder types in place for a year or so. The EOR is only required to check stability for girder designs that exceed the maximum span limit. The contractor is still responsible for checking the stability of girders for handling and erection.

Bill reported that the Islands Expressway Project is set to break ground soon. It is a high-level crossing that will use spliced girders. Stainless steel has been specified for the prestressed piles on the project. By August, expect several more projects including a precast deck project in Henry County, a deck girder project, and a challenging ABC project on Northside Drive near downtown Atlanta which will use precast deck panels on steel girders along with other strategies to accelerate construction.

NCDOT – Brian Hanks reported that the dust has settled after staff reductions and the reorganization of the Department. The entire bridge replacement program is now the responsibility of Structure Management Unit, so they will be responsible for not only bridge design, but also to obtain roadway and hydro permits. They have a 5-year bridge program with $330M that should address about 1200 bridges on the primary and interstate systems. They also have a bridge preservation program for existing bridges with about $40M a year for redecking, shotcrete repairs, etc. Divisions also have projects that are mainly on secondary bridges. Most bridges are precast. They are seeing a number of FIBs being used, including for an in-house project. They are designing in-house the Harkers Island project, which is a 35 ft wide and 3200 ft long bridge that will use 54", 72" and 78" deep FIBs and probably 30" square piles near Cape Lookout. Girders and piles will use carbon fiber strand. There will be no steel reinforcement in any part of the bridge if possible – it will all be carbon fiber or GFRP. They have applied for additional funding from FHWA for the project which they hope to let in Fall 2019. NCSU has done some research using the carbon fiber strands for prestressed bridge members. Trey Carroll is also working with Michigan DOT which has done a lot of work with carbon fiber. The Department continues to work on FIB standards.

Cabell Garbee reported that Jason Poppe is now the Concrete Products Engineer in the Materials & Tests Unit and will be responsible for all prestressed and precast concrete products, including pipe and segmental retaining wall systems.

SCDOT – Steve Nanny reported that SCDOT has been working on an ABC project using a decked girder. It was to be let in February but has been pushed back to December. The gas tax increase is now in place, increasing by 2 cents each July for 6 years. Some of the funds will be used to address over 450 load restricted bridges. It has not yet been determined how those projects will be packaged so they haven't hit the street yet, and probably won't this year. Some projects are expected to be let using design/build but the package size is still not known. Some other high priority safety projects are using the funds as well. He was not aware of any projects using innovative corrosion resistant materials.

PCI & G/C PCI –Reid Castrodale encouraged those attending the upcoming PCI convention to consider attending technical committee meetings and also mentioned some papers of interest. Richard Potts mentioned that there will be some sessions related to UHPC. Peter Finsen pointed out that there well be a Strut-and-Tie Modeling workshop from FHWA that DOTs can apply to attend and reminded attendees about the G/C PCI dinner at convention.

Peter mentioned that nearly all PCI technical bridge resources are now available at no cost, except for the bridge repair manual. The Gulf South Chapter of PCI is considering the use of NEXT beams and has sent out a survey to the DOTs requesting information on their experience with NEXT beams – Peter encouraged the DOTs to return the survey.

Reid Castrodale mentioned that a cross-walk document is now available on the AASHTO Bookstore website which provides the equivalent article numbers between the new 8th edition of the *AASHTO LRFD Bridge Design Specifications* and the earlier edition as Section 5 on Concrete Design has been reorganized.

UGA Research for GDOT – Prof. Mi Chorzepa

Professor Chorzepa reported on two projects she is working on for GDOT. The first project is related to asset evaluation using inspection data available for bridges in GA. They are just getting started and will be looking at many variables. The second project is related to accelerated bridge construction for a P3 project where extensive cracking was found in the deck 3 months after construction. They are looking at the structure as well as materials. They cannot reveal much information about the project at this time. The bridge was moved into place with SPMTs and some elevation adjustments were made. They have been encouraged to develop solutions that would not limit innovation in design/build and P3 projects.

5. Materials, Fabrication and Construction

5.a Accelerated Construction ..... *Informational Item*

Lead: Bener Amado.....William Nickas, Reid Castrodale

Richard Potts reported on the Fort Pulaski bridge replacement project for Eastern Federal Lands near Savannah, GA which is using a number of precast elements to speed construction. They have received approval for substituting metakolin for microsilica. The contractor is fabricating precast caps and abutments. Plans include prestressed beams, prestressed concrete piles, and precast prestressed concrete partial depth deck panels.

Action item(s) completed:

New action item(s):

5.b Reciprocity for Certifications and Other Issues ..... *Active Item*

Lead: JR Parimuha.....Chris Peoples, Aly Hussein, Gary Shrieves

There has been no activity related to this item.

Action item(s) completed:

New action item(s):

5.c Tolerances ..... *Active Item*

Lead: .....

Reid Castrodale reported that the report on tolerances prepared by Mike Culmo for NCHRP, about which he had given a presentation at an earlier meeting, has been completed and published as a web-only document. The link to the NCHRP webpage for Project 12-98, which contains links to the report and 2 major appendices, is:

http://apps.trb.org/cmsfeed/trbnetprojectdisplay.asp?projectid=3649

The report also includes information on the dynamic effects on structures caused while moving.

Reid Castrodale suggested that the national PCI bridge committees should consider developing tolerances for deck girders since this type of section is becoming more popular. WSDOT may have established tolerances for deck girders since they use that section.

Action item(s) completed:

New action item(s):

5.d Silica Requirements and Rubbing Girders ..... *Active Item*

Lead: Jeff White .....

Jeff White described the new silica dust requirements and how they impact rubbing of girders. The G/C PCI annual meeting had a speaker on this topic. Equipment has been developed for most other plant processes that will capture the dust, but that is not possible for rubbing girders which has been typically required by DOTs. Furthermore, the rubbing activity is generally performed in restricted areas between closely spaced girders in storage, which leads to additional requirements for confined spaces. Therefore, it appears that it would be best to eliminate silica dust by eliminating the requirement for rubbing girders. It is recognized that it may be important to have a uniform appearance for exterior beams, so rubbing or coating may be necessary. But for interior girders that are not visible, it would seem that rubbing could be eliminated. The producers indicated that they would rather paint exterior girders than to rub them.

The DOTs agreed that they all require all girders to be rubbed, which usually involves an initial wet rubbing to coat the girders, then a dry rubbing to smooth the surface. The dry rubbing is the source of silica dust. It was also noted that GDOT has been requiring the full length of piles to be rubbed.

The definition of a form finish was discussed, since that is what is required by the specifications for the girder surface. The size of bug holes or blemishes that require filling was also discussed. Producers emphasized that they are not trying to get by without repairing problem areas.

This led to a discussion of the status of using self-consolidating concrete (SCC) for girders, since its use may produce a better surface, eliminating bug holes, and therefore the need to rub girders. It appeared that the status of SCC in the DOT specifications should be reviewed to see what they currently allow or require for SCC. SCC is not a cure all but does typically improve the finish of beams. It is not clear whether internal vibration was allowed for SCC by the three DOTs, which may be needed at ends of girders to get proper consolidation, even with SCC.

Jon Smith indicated that GDOT only allows SCC on a per project basis where a project special provision for SCC is included in the contract. He suggested that piling might be a good place to start with SCC. It is a hard mix to use; moisture in aggregates must be controlled very carefully. Only one precaster is currently using SCC for GDOT projects, and that is for soundwalls. However, Jon also noted that with SCC, the form finish is so smooth that rubbed areas stand out as very different, so the entire girder may need to be rubbed or painted.

Steve Nanny recalled that SCDOT had used SCC for girders in an IBRC project possibly 10 years ago. He was not sure of the outcome of that project nor whether SCC was currently being used for any SCDOT projects. He was not sure if SCDOT's SCC specification had been fully developed or released.

Romeo Garcia was not aware of any activity on the silica issue being taken by FHWA on a national basis.

It was agreed that the issues of rubbing girders and SCC should appear on the agenda for future meetings to continue this discussion.

New action item(s):

- *Send previous G/C PCEF SCC comparison to DOTs for updating* — *G/C PCI*

6. Parameters and Standardization

6.a Precast Pavements [approach slabs] ..... *Informational Item*

Lead: Brian Hanks

Richard Potts reported that SCDOT held an FHWA workshop on precast pavements. Aly Hussein also attended; he reported that Shiraz Tayabji with ARA presented the workshop (Shiraz has been a member of the PCI Precast Concrete Pavement Committee). He reported that SCDOT was looking at using precast pavements.

There was no activity on the action item.

Action item(s) completed:

New action item(s):

6.b Full-Depth Bridge Slabs.....*Informational Item*

Lead: Brian Hanks.....*Bill DuVall*

Bill DuVall agreed to send the presentation listed as an action item which was given at the August 2016 meeting.

The AccelBridge concept developed by Eddie He was discussed. Steve Nanny indicated that SCDOT does not allow partial or full depth precast decks on their bridges, but would be interested in seeing how the bridges that have been built using the AccelBridge system have performed. It was agreed that a presentation would be considered in a year or so, and that a link to the website for the system would be included in the minutes: http://accelbridge.com/. Eddie had given a presentation on the concept at G/C PCEF meeting #8 in February 2012, which is posted on the G/C PCEF webpage. NCDOT would also be interested in the concept.

Action item(s) completed:

New action item(s):

6.c Process Standardization.....*Various*

Lead: Jeff White

The following issues were discussed.

6.c.1 RFID/Bar codes for precast products..... *Active Item*

Cabell Garbee gave an update on implementation of RFID. The system is working well and the Department is planning to use the system as a production method within a month or so, eliminating the need to stamp girders. There are some glitches that occur occasionally, but they are getting resolved. Jeff White reported that the system had been working well to inventory girders, but that some issues have come up such as responsiveness of Idencia. Cabell Garbee suggested that Idencia may be experiencing issues related to sudden growth.

Action item(s) completed:

New action item(s):

6.c.2 Full-Length Debonding of Strands..... *Active Item*

Richard Potts reported that NCDOT allows strands to be debonded for the full length of some products in order to allow fabrication of products with different strand patterns. There are some rules that must be followed, including details to seal strands at the end of the product. SCDOT allows limited full length debonding with some restrictions on locations of debonded strands. NCDOT has a written policy allowing full length debonding for cored slabs, but it is also allowed in some cases for girders by showing in shop drawings. JR Parimuha reported that NCDOT cored slab standards allow 30 ft slabs to be cast with 55 ft slabs, which is a 10 strand difference, although they don't go with that many strands. He also reported using it for some girder projects. Jeff White reported that his plant has only used the procedure for one pour where a four-girder span had a different number of strands in each girder, in increments of 2 strands. The 2018 NCDOT cored slab standards are on their website but are only available as Microstation files.

Action item(s) completed:

New action item(s):

- *Distribute notes from NCDOT cored slab standards allowing full-length debonding* *JR Parimuha*

6.d Reinforcement Details ..... *Active Item*

Lead: Richard Potts.....*Reid Castrodale*

Stirrup Projections

Richard Potts has looked at details for stirrup projections. He plans to collect details from different suppliers to achieve different stirrup projections. Projects with different stirrup bars complicate fabrication because often bar increments are less than the bending tolerance, so it is difficult to make sure that the correct bar is being used. Field bent stirrups, which are an option for GDOT projects, simplify girder fabrication, but contractors prefer prebent bars. Multiple bar marks for stirrups leads to difficulties in fabrication, and to more waste since extra bars are usually ordered for each bar mark.

It was suggested that design recommendations for details to accommodate varying bar projections should be developed by G/C PCI. However, approaches used by fabricators need to be collected first (existing action item).

Bill DuVall asked about rebar bending tolerances. Richard Potts responded that, for his plant, they may specify tighter tolerances than required by the DOT for some bars to make sure that the bars will fit up properly. For machine bent bars, the tolerance can be as low as ¼". Bill asked because he had seen some girders where an intended 5" projection varied from 3" to 6" along the girder.

Continuity Bar Details

Richard Potts reported that fabricators prefer the NCDOT detail which uses straight No. 5 bars that are bent up after the girders are fabricated.

Top Strand Debonding

Reid Castrodale reported that the AASHTO T-10 Technical Committee has proposed a ballot item to be considered at the 2018 meeting that addresses lateral stability and top strand debonding. The agenda item was initially proposed by WSDOT. The development of a G/C PCI recommendation on top strand debonding will be delayed until the outcome of the agenda item ballot is known. Reid Castrodale agreed to try to obtain the current copy of the agenda item and send it to the committee.

Action item(s) completed:

New action item(s):

- *Distribute the agenda item to the DOTs* — *Reid Castrodale*

6.e Girder Shapes ..... *Active*

Lead: Reid Castrodale ..... *Gary Shrieves*

FIBs are being considered by the DOTs. This shape may be used for a proposed standard deck girder shape, although there are no current plans by any state to pursue a standard deck girder section.

Action item(s) completed:

New Action item(s):

6.e.1 Lateral Stability ..... *Active Item*

Trey Carroll reported that lateral stability evaluation based on the PCI Guidelines is being incorporated into their in-house design program. The spreadsheet that automates calculations in the PCI Guidelines has not yet been completed and a release date is not known.

Action item(s) completed:

New action item(s):

6.f NEXT Beam ..... *Active*

Lead: ..... *Bill DuVall*

Bill DuVall reported that four NEXT beam projects have been completed. It is possible that more may come in future projects. There have been a few issues with the four projects and adjustments have been made. Bill agreed to prepare a presentation on the NEXT beam projects for the next PCEF meeting.

Steve Nanny is not aware of any plans for modified NEXT beam projects in SC. Trey Carroll reported that NCDOT is still not considering use of NEXT beams.

Action item(s) completed:

New Action item(s):

6.g Precast Substructure Elements.....*Informational*

Lead: .....JR Parimuha

Precast pile caps

Richard Potts reported that he has been involved with a project that used precast caps for a project in GA. He will send information on the project that used two-piece precast caps for a 5-pile bent.

New action item(s):

- *Distribute precast cap details for recent project* *Richard Potts*

Precast substructures

Jason Hewatt reported that they have a project in Auburn, AL with precast columns that included brick facing.

7. New Business/Informational Items

Jason Hewatt asked about precast barrier rails to allow a totally precast bridge system. Bill DuVall reported that they will have to use MASH compliant barriers by the end of 2019, so they are moving away from Jersey shape barriers to 36-in. and 42-in. constant slope barriers. It was noted that the NCDOT Ocracoke Island Project used barriers that were precast onto cored slabs. Bill DuVall thought that a barrier cast on a cored slab or box beam while in the plant should be acceptable regarding barrier capacity.

Bill DuVall said that they were seeing some water moving through joints between box beams even with a membrane and asphalt on the box beam. Trey Carroll reported that they are also seeing some water coming through joints, but they do not use membranes. Bill said that they are concerned that the membrane is sliding as asphalt is being placed on the deck.

Richard Potts reported that PCI is supporting expanded use of UHPC. Standard Concrete Products has developed their own UHPC mix. They cast three octagonal test piles with UHPC the day before; the piles were octagonal and the void was larger to reduce the quantity of material used.

Steve Nanny reported that SCDOT had updated their website the previous weekend so any links to the old website will no longer work.

8. Develop/Review List of Action Items

9. Evaluation of Committee Progress/Process

10. Next Meeting Date & Location

Thursday, February 15, 2018 (10 am – 4 pm), at GDOT

Thursday, August 16, 2018 (10 am – 4 pm), at NCDOT

Adjourn

The meeting was adjourned at about 3:00 PM.

ATTENDEES: G/C PCEF Committee Meeting – February 8, 2018 at GDOT

Attend in Person	Attend via Web	Name	Company	Phone	Email
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		GDOT			
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