MINUTES

SCDOT – PCI Joint Committee Meeting

Remote meeting using GoTo Meeting

May 7, 2020 – 2:00 PM

Terry Koon welcomed attendees and began the meeting at about 2:05 PM. Meeting was held remotely using GoToMeeting due to coronavirus concerns.

Following the welcome by Terry Koon, the meeting was turned over to Reid Castrodale.

The following participants were identified by their connection:

SCDOT

Terry Koon	Preconstruction Support, Co-Chair
Hongfen Li	Preconstruction Support
Phillip Washington	Preconstruction Support
Ani Carignan	Preconstruction Support
Ben McKinney	Design-Build
Caleb Gunter	Office of Materials and Research
Steve Nanney	Construction
Beverly Hollowell	RPG-1
Lalith Galagadera	RPG-1
Jerry Phipps	RPG-2
Matthew Bishop	RPG-3
Tong Li	RPG-3
Glenn Patterson	RPG-4
John Caver	RPG-4

PCI

Peter Finsen	Georgia/Carolinas PCI
Reid Castrodale	Castrodale Engineering Consultants, Co-Chair
Jeff White	Prestress of the Carolinas
Richard Potts	Standard Concrete Products
J. R. Parimuha	Florence Concrete Products
William Nickas	PCI

FWHA

Blake Gerken	South Carolina Division Office

Academia

Paul Ziehl	Univ. of South Carolina
Briana Crabtree	Clemson University

Minutes of Last Meeting

Minutes of the September 30, 2019, meeting were distributed prior to the meeting. The minutes were approved as distributed. Minutes and agendas, along with supporting information, are posted on the G/C PCI website.

Old Business

01-6 *SCDOT Bridge Design Manual*

Hongfen Li reported that they have received proposals for revising the Bridge Design Manual (BDM). The proposals are being reviewed remotely and evaluation should begin within two weeks. She also reported that they have been informed by the SCDOT Procurement Office that the meetings for evaluating proposals will be open to the public. They are still planning to hold to the selection dates given in the RFP. Hongfen also indicated that G/C PCI and other interested groups will be kept informed about opportunities to provide input to the process.

Hongfen also reported that their work on the standard drawings and details has slowed with their main efforts going toward the BDM. They want to work the development of the BDM and standard drawings together.

Terry Koon noted that Hongfen has been working on memos to bring their practice up to date with the *AASHTO LRFD Bridge Design Specifications* 8th Edition, and that these memos are just about completed. Reid Castrodale noted that the 9th Edition of the LRFD Specs is now available, and that he had purchased his own copy.

Steve Nanney had no report on the status of the contract for revising the Standard Specifications.

09-1 *Accelerated Bridge Construction Projects*

Terry Koon reported that they hope to have a chapter on ABC in the new BDM, which may also incorporate the use of UHPC. He also noted that they have received an inquiry from the Alabama DOT about the modified NEXT beam. The NEXT beams are not yet listed as a standard section. They are now more interested in box beams for projects.

Reid Castrodale noted that in the low volume design guidance includes only cored slabs, steel girder and prestressed concrete girder bridges. Terry indicated that these are their "typical" bridge types, so box beams and NEXT beams have not yet been added to that group.

JR Parimuha asked which depth box beams were being considered by the Department. Hongfen said that they were considering a range of depths, but that they want to use the sections in current use. It was pointed out that NCDOT and GDOT are using the AASHTO standard box depths of 27, 33 and 39 in. Terry Koon noted that the Department

is looking at box beams to extend the range of cored slabs, so they can get into the 80 to 100 ft span with a shallow depth to help out the hydraulic design. It was pointed out that the 39 in. deep section could provide spans up to about 105 ft.

John Caver asked producers if other DOTs have limits on skews for cored slabs and box beams. He indicated that the current BDM has a limit of 15 deg. skew for cored slabs. Richard Potts indicated that cored slabs and box beams can be fabricated with skews. Installation of tie rods can become an issue. The largest issue for skewed members is the bearings. If bearings are on the skew, the bearing at the acute corner will be pinched and the members can tend to rock. This effect is significantly aggravated by the grade of the bridge. With a relatively flat grade, a skew of 30 deg. could be tolerated. But with a significant grade, it will be an issue.

Reid Castrodale mentioned that Chapter 6 of the *PCI Bridge Design Manual* has design charts for box beam and other sections. Those charts show 39 in. box beams with spans up to 110 ft and the 42 in. box beams spanning up to 120 ft.

Richard Potts gave a brief overview and update on the PCI research project on UHPC. The Phase I report for that project has been published and is available on the PCI website: https://www.pci.org/PCI_Docs/Members_Only/Research%20Reports/Material/IMPLEM.pdf

The topic of sources for steel fibers for UHPC was discussed. The previous domestic source for fibers is no longer making the fibers, but it is expected that another supplier will begin making the fibers in the US soon. William Nickas gave some background on fibers – Bekaert has stopped production of micro fibers in the US market, but Sumiden is considering beginning to produce micro fibers in the US. There is also a "hyperfiber" which is associated with Michigan State University, but it does not have quite the same strength as the micro fibers.

12-1 ***Tentative Letting List***

Terry Koon indicated that he had encouraged the RPGs to add information on girder types to the bridge descriptions on the letting list. Terry said that he would contact the RPG structural engineers again to encourage them to provide more detailed information on the letting list regarding the expected girder type for projects when it becomes available. Terry asked that the fabricators let him know if the information is not showing up.

Jeff White reported that he was looking at the site and only a few projects showed adequate descriptions, while others did not. Terry noted that the RPG structural engineers should be on the call, so they are hearing the request; but he would still remind them. In some cases, the list is showing "to be determined", so it appears that such a project is on the list but has not reached the point in its development where girder types are known.

16-2 ***UA Bars in BTs***

Terry Koon reported no progress regarding the UA bars, but that the details will be updated as part of the standard drawings and details project.

Reid Castrodale presented some information on comparisons of continuity connections for NCDOT bar details and bent up strand details based on the same provided force. The slides will be posted on the G/C PCEF website after the meeting.

William Nickas noted that current practice is to not use debonded strands for the continuity connection.

Hongfen Li asked whether the two options of bent bar or strand connections should be offered for the small girder sections. The fabricators indicated that they would like the option to use either detail for any type or size of girder where a continuity detail is required.

While not part of this topic, the details for bearing plates was discussed briefly since is of significance for the current UA bar details where the center bar conflicts with the center row of studs. The Department has not worked on an alternate details, but would entertain details presented by the fabricators on shop drawings. If they plan to use the different detail, Terry asked that the fabricators alert the RPG design engineer about the intended revision.

17-1 ***Debonded Strands***

Debonding in Bottom Row

Reid Castrodale noted that the new debonding requirements from the LRFD Specifications were discussed during the Prestressed Concrete Bridge Design Seminar last October, so there are a number of slides in the handout package that describe the new provisions. These requirements do not prohibit the debonding of strands in the bottom row, and the examples used in the commentary do show debonding in the bottom row.

Terry Koon indicated that their current policy of not allowing debonding in the bottom row would be revisited during the revision of the BDM. But he did offer that this could be changed if needed by a design memo prior to completion of the BDM after the BDM consultant identifies any needed changes to the policy. The work on the BDM is anticipated to take 3 years, so the change in policy could be instituted earlier.

JR Parimuha indicated that without allowing debonded strands in the bottom row, a designer is very limited in positions where debonding can be used, which can lead to draped strand designs, or designs where both debonding and draping are used. They are seeing this is in all sizes of girders, such as 4 strands draped in a Type III beam.

William Nickas reported that in MN, the DOT has allowed producers to submit shop drawings that change debonding and draping as shown on the plans to implement the new provisions for debonding. This allows the Department to get some experience with the new provisions before they consider full implementation in their BDM. Terry Koon agreed that the Department could also do this if a producer wanted to work with the designer and submit revised debonding and draping on the shop drawings.

JR Parimuha indicated that the fabricators are familiar with debonding in the bottom row because NCDOT has been allowing it. Terry thought he would check with Barry Bowers to see if he remembered the reasons for not allowing the bottom row debonding. Reid also offered assistance if the Department needed it during their considerations.

Full Length Debonding

Reid Castrodale presented some slides and proposed notes on full-length debonding. The slides will be posted on the G/C PCEF website after the meeting. Terry Koon suggested that instituting a policy on full-length debonding will probably be tied to the development of the standard drawings.

Terry noted that they have a cored slab project which does have a note on the contract plans that allows the option of full length debonding. They see this as a test case. It is the project over a dam where the bridge is on a curved alignment. The plans are essentially done, but they are not sure when that project will go to bid. JR Parimuha said that the notes also included requiring the removal of the strands. Hongfen had some experience in a design/build project where full-length debonded strands were allowed. The fabricator had actually tried to remove a strand from the debonding. JR said that they treat the full-length debonded strands the same as partially debonded strands, where they provide a recess at the end of the beam and then seal it with epoxy grout. Terry thinks that this would be acceptable.

17-2 ***Prestress Design Seminars/Workshops/Tours***

Terry Koon reported that SCDOT felt that the Prestress Concrete Bridge Design Seminar held Oct. 1, 2019, was a great success. He hoped that a seminar could be held every 2 to 3 years. Peter Finsen indicated that the other 2 DOTs are doing a seminar every other year, and Terry agreed that the Department would be interested in that.

Reid Castrodale reminded the group that the Department had been interested in having a plant tour associated with the Prestressed Concrete Bridge Design Seminar, but that did not happen. Terry Koon indicated that the Department is still interested in a plant tour. G/C PCI members will discuss and get back with the Department with options.

Peter Finsen briefly discussed the inspectors' workshop that was held for NCDOT, and offered a similar program for SCDOT. Peter also mentioned that GDOT has been interested in such a workshop and that there had been some preliminary discussions, but that further work on the seminar is on hold at the current time. Peter indicated that the

NCDOT workshop was based on the PCI repair manual that is currently being updated. G/C PCI would be glad to meet with SCDOT to define the content of the workshop. Terry suggested that Peter coordinate with Caleb Gunter and Steve Nanney on the workshop. Peter agreed to send the NCDOT seminar agenda to them as a starting point for discussions.

17-3 ***Standard SIP Form Clip Insert Details***

Terry Koon reported that he and Hongfen had discussed the topic but had not yet contacted the form suppliers. They will try to make some calls to fabricators on the topic and are agreeable to using the approach taken by NCDOT with standard clip sizes and spacings.

19-1 ***FIBs***

Terry Koon reported that they have established pay items for the standard sizes of FIBs. He noted that some projects have used "modified FIBs", but he thinks that those are only modified with respect to the strand pattern and not the section dimensions. He expects that the standards will be developed with their anticipated standard drawing contract.

Hongfen Li mentioned that they are interested in allowing options to obtain the most efficient designs, so they expect to allow draping with use of the FIB shapes.

Reid Castrodale mentioned that the fabricators are seeing quite a lot of variation in details for projects that are using FIBs, and in some cases, variation within the same project. Therefore, he encouraged the Department to consider establishing some standards as soon as possible. Terry understood the situation but would like to have the consultant in place for the standard drawing and details contract so they could be involved with such decisions. Terry asked the fabricators to let him and Hongfen know if they see details in plans for FIB projects that are a concern. He said that he only sees design/bid/build projects, so he does not see what is going on with design/build projects. They may be able to address some of the concerns. Reid also mentioned that NCDOT and GDOT do not yet have standards for the FIBs.

19-2 ***Lateral Stability***

William Nickas gave an update on PCI activities related to lateral stability. The Excel calculator is completed, and the manual has been approved by PCI; both should be available for download from the PCI website in the next few weeks. Two of the related training courses on lateral stability are currently available on the PCI eLearning center: T520 which provides an introduction to stability and discusses stability of girders when hanging; and T523 which discusses stability of girders during transportation. The last two modules are in progress, which include T525 that addresses stability of girders when seated on bearings, and T527 which provides training on the use of the Excel lateral stability calculator. All PCI eLearning courses can be found at http://elearning.pci.org/

William also mentioned that PCI will be releasing two new books that will be available for free download in the next few weeks from the PCI Bookstore at https://www.pci.org/bookstore:

- *Bridge Geometry Manual* (CB-02-20)
- *Guide Document for the Design of Curved, Spliced Precast Concrete U-Beam Bridges* (CB-03-20)

Reid Castrodale discussed the plan to have a focus on lateral stability for part of the G/C PCEF meeting in August 2020. The intent is to give an opportunity for owners to consider their options for implementation of the lateral stability requirement that now appears in the LRFD specifications which must be considered by designers, and what that can look like. WSDOT information, which includes both their Standard Specifications and their Bridge Design Manual, will be discussed. This information has been sent to Terry Koon and Hongfen Li, along with a copy of the PCI lateral stability spreadsheet. The approach taken by GDOT was also discussed, in which they provide a table of maximum spans – lateral stability must be investigated for spans exceeding the limit, while spans equal to or less than the limit can be assumed to be stable based on the assumptions made. The GDOT table appeared in the minutes of the last meeting. William Nickas mentioned that WI and IL also have tables like GDOT. Jeff White indicated that he liked the tabulated limits for lateral stability.

New Business

For Information

SCDOT Preconstruction Updates

Terry Koon mentioned that they are working through some issues related to their Load Rating Guidance Document (LRGD) as the Department is finding that the new procedures and loads, such as the new EV-2 and EV-3, are having an effect on designs. They are now requiring load rating at the completion of design. They are working on a new policy to address this, to avoid having new designs that do not load rate.

He also mentioned that Maintenance is not considering elastic gains during their load rating process, so they are now preparing a design memo that will prohibit the use of elastic gains for prestress designs. Some design programs automatically use elastic gains, so designers need to be aware of this. The Department's software for load rating, however, does not consider elastic gains. He mentioned that Maintenance may allow use of elastic gains if the bridge will not otherwise meet load rating requirements. They are now trying to figure out what can be done for projects that are already in process.

Terry also mentioned that the design memos are very close to being complete which will bring their design practice up to the 8th edition of the LRFD Specifications. He noted that the Design/Build Group has already been using the 8th edition.

SCDOT Revenue Situation

Terry Koon reported that the current virus situation has had an impact on their budget situation. The SCDOT Secretary has just issued a memo requiring a budget cut of 10 to 12% due to lack of revenues from gas tax collections. This may affect travel, but they are not sure. He did not think that the BDM and standard drawing development contracts will be impacted by the cuts. Steve Nanney indicated that they are evaluating funding for each letting, but so far there are no cuts in programming.

PCI Convention and National Bridge Conference

Peter Finsen reported that the next PCI convention will be in February 2021 in New Orleans. It will include the National Bridge Conference as well as The Precast Show. G/C PCI plans to continue to offer to sponsor 4 engineers from each of the DOTs. A call for papers should be released soon.

Research

No report.

Next Meetings

The next joint meeting is scheduled for Thursday, November 12, 2020, at 1:30 p.m.

The next G/C PCEF Committee meeting is scheduled for Thursday, August 13, 2020, in Columbia, SC. Peter will contact Terry to arrange for meeting space.

The meeting was adjourned at 4:10 P.M.

Action Items

From prior meeting:

- Terry Koon agreed to send an email to RPGs asking them to provide bridge type information to be included on the Tentative Letting List. **COMPLETED**
- Reid Castrodale agreed to forward a draft copy of the PCI spreadsheet on lateral stability design to Terry Koon as well as information from the WSDOT Bridge Design Manual and Standard Specifications, which provides the method and parameters to be used to evaluate lateral stability for both lifting and transportation. **COMPLETED**
- Terry Koon agreed to work toward standard SIP steel form clip size and spacing.
- G/C PCI to provide details related to continuity connections or joint elimination from other states for consideration by the Department.

From this meeting:

- Reid Castrodale to post slides on G/C PCI website that compare rebar and strand continuity connections.
- Reid Castrodale to post slides on G/C PCI website that present full length debonding notes and section properties based on notes from NCDOT cored slab details.
- Terry Koon offered to allow fabricators to submit on shop drawings with revised bearing plate details without the center row of strands.
- Terry Koon offered to allow fabricators to submit on shop drawings with revised bearing plate details without the center row of strands.
- Terry Koon offered for producers to work with the designer and submit revised debonding and draping on shop drawings that implement the new requirements in the 9th edition of the LRFD Specifications, including bottom row debonding.
- G/C PCI to develop options for a plant tour for SCDOT and consultant engineers.