

NCDOT - PCI Joint Technical Committee Meeting

Structures Design Small Conference Room
July 16, 2015 - 1:30 PM

Submitted by
Reid Castrodale, Chair

Attendees:

NCDOT: Brian Hanks, Darren Scott, Paul Lambert, Trudy Mullins
G/C PCI: Richard Potts, JP Binard, Peter Finsen, Reid Castrodale, JR Parimuha, Jason Moore, Bert Richardson, Fecky Langi, Ken Foster, Chris Arca
NCSU: --

Chairman Reid Castrodale welcomed all to the meeting. Self-introductions were made.

1. Top Strand Debonding

Information on top strand debonding details and procedures from different locations across the country was provided to NCDOT by G/C PCI prior to the meeting. Procedures and notes from WSDOT were included. Some recommended notes were provided.

In the discussions, the G/C PCI member indicated that top strand debonding is not an end in itself, but rather one approach to deal with the larger issue of handling and stability of girders. Top strand debonding can be helpful for addressing the requirement in the NCDOT SDM that the tensile stress at release is limited to 0.2 ksi. The Department does not allow an increased tensile stress when reinforcement is provided to carry the full tension force, as permitted by the AASHTO LRFD. Increasing this limit to match the AASHTO LRFD provisions would also help. It was noted that top strands allow the lifting loops to be moved in to improve stability. It is also possible to use top strands to control camber, but this application is used less frequently.

Brian Hanks asked about stability issues. PCI national has been working on this issue, and will publish a guide, a spreadsheet, and web-based training in the near future. The main issue is that in some cases, girders are being designed that may have problems with stability, but this is not being considered by the designer. In fact, some girders cannot be safely lifted from the bed as designed, so they must be redesigned by the prestresser prior to fabrication. The issues are not limited to bulb-tee girders, but also occur for stretched out small AASHTO girders. Communication with the contractor is key for them to understand how to properly detension the top strands in the field.

There is not always enough information at bid to determine if there is a potential issue. Some prestressers do not have an engineering staff that can recognize that stability should be checked for a girder.

It was suggested that suppliers could go to the field to do the detensioning to make sure that the detensioning is properly done and that the girders are not damaged. It was reported that, in the NW, they have not had problems with contractors doing the detensioning. Fabricators would prefer not to go to the field to detension, both from a cost issue and from an insurance issue. It was noted that prestressers are classified as a manufacturer for OSHA, not construction.

Top strands are typically detensioned prior to shooting grades for deck forms since the girder camber will increase after the strands are detensioned.

It was suggested that a higher temporary stress could be allowed for handling, but the designer could still be limited to the 0.200 ksi currently used. This would give the prestresser some flexibility to adjust the design to address handling and stability issues.

There has been significant discussion on this issue on the national level, but there is no consensus. Designers think that the contractor should be responsible, the contractor does not think they should be responsible, so it falls on the precaster to make the designs work, or to modify them so that they will work. The AASHTO LRFD appears to have contradictory requirements concerning these issues, with the contractor being responsible for means and methods, but the designer is responsible for considering all loading conditions.

It was noted that while these issues are most likely to be encountered in design build projects, there have also been problems in conventional design-bid-build projects.

To move forward with these issues, NCDOT wants to make sure that it is fully addressed on the construction side. Guidance is needed for designers in the SDM. This can refer to the PCI Bridge Design Manual discussion of lateral stability issues. It was noted that erection plans are not required for prestressed concrete girders.

Trudy Mullins reported that top strands were used successfully to control top cracking in girders for the Washington Bypass. Brian Hanks pointed out that the girders were initially designed for top tension greater than 200 psi, but that resulted in significant cracking. When top strands were added, the stresses dropped below 200 psi and the cracking was eliminated. Chris Arca reported that their experience has been good on their current project which is using top strands. They had met with the contractor to discuss issues related to the top strands.

ACTION ITEM: G/C PCI will prepare draft guidance for designers related to the top strand concept for both the NCDOT SDM and for notes to appear in the contract plans. Standard notes for shop drawings and erection sheets should also be developed by G/C PCI to inform the contractor. The focus should be on detensioning and handling when removing from the bed – not transportation. It should be presented as 2 options – one for the prestresser and one for the designer.

2. Bar Codes for Precast Items

The deadline for implementing embedded tracking devices in precast products is January 1, 2016, but there is currently no deadline for prestressed concrete products. Darren Scott estimated that the deadline for prestressers could be around July of 2016. There should be more information available by the next joint meeting in November. NCDOT plans to provide adequate lead time for purchase and set up of equipment.

Details still need to be worked out, such as where to place the devices for bridge products. NCDOT would like to be able to access the devices during the biennial bridge inspections.

3. Stressing Strands in the Draped Position

Paul Lambert indicated that they usually allow stressing in the draped position for beds with only 2 girders, but he hasn't seen any such set-ups in quite a while.

The issue was addressed by a report by Dr. Zia when John Smith was the state bridge engineer. They felt that safety was an issue.

JP Binard indicated that they stress strands in the draped position as standard procedure for VDOT projects since this approach is covered in the VDOT Standard Specifications. They usually avoid harping by redesigning for straight strands.

Paul Lambert asked about maintenance of the rollers on hold-up or hold-downs that are reused. He was interested in seeing specifications related to this.

ACTION ITEM: G/C PCI to provide the Department with examples of multi-beam stressing that include the anticipated effect on stresses. The effect of the total angle change on the strand stress should be considered, similar to design for post-tensioned tendons.

ACTION ITEM: G/C PCI to consider presenting this as an item for consideration by the PCEF Committee. The approach could be based on the VDOT specifications.

ADDITIONAL DISCUSSION ITEMS

Upcoming NCDOT Projects

Brian Hanks gave some information on the upcoming Pea Island “temporary” bridge project. They are working on plans for the approximately 2300 ft long bridge that will be constructed using cored slabs. They are looking at 47 spans, and 8 piles per pile bent. They anticipate that it will require 564 cored slab units. It would be top-down construction.

Topics for G/C PCI Seminar

Potential topics were discussed for a design seminar hosted by G/C PCI. NCDOT sent mostly young engineers to the seminar in 2014. They may expand the range for the next seminar. The date for the next seminar should probably be Fall 2016. It was suggested that the time for the panel discussion should be expanded, since that was seen as a very valuable portion of the seminar. The next seminar should probably have less focus on design than the 2014 seminar.

Suggested topics included: discussion of draped strands and the fabrication issues associated with them; more information about fabrication, including length of beds, plant photos, stressing of strands, handling of beams and slabs; specific details about fabrication of different types of bridge products – cored slabs, box beams and girders; lightweight concrete used for bridge at Thomasville.

Requested Clarification on 1078-7

JP Binard requested clarification of Article 1078-7 in the Standard Specifications.

Calcium Nitrite Testing Issues

It was mentioned that four sources of calcium nitrite are being used for NCDOT projects. A meeting is scheduled for the week after this meeting to discuss the issues.

Entrained Air Testing Requirements

Darren Scott reported that M&T is reviewing their whole concrete testing program. They are being encouraged by FHWA to look at reciprocity with other states. Darren asked that fabricators send him info and he will pass it on.

Upcoming Events

The next PCEF Committee meeting is in Raleigh on August 20, 2015. It will be held in the M&T conference room.

Training for Plant Inspectors

G/C PCI offered to assist NCDOT in the training of their plant inspectors using certification courses available from PCI. Trudy Mullins indicated that they are hiring consultants for CE&I work and that they are requiring prestress plant experience. NCDOT is planning a certification class for prestressed concrete to be held in the next several months. Their regional inspectors are handling it. Much of the course will cover items that are only of concern within NCDOT, such as HICAMS.

The idea of sharing inspectors between states was brought up. There was some interest from NCDOT. It would also be good to have consistency between states.

ADJOURN

Trudy Mullins mentioned that she would be leaving NCDOT on August 31. All present wished her the best in her retirement.

The meeting was adjourned at 4:00 PM.