

NC DOT / PCI Joint Technical Committee Meeting

Structures Design Conference Room
October 5, 2005 2:00 PM

Submitted by
Reid Castrodale, Chair

Attendees:

NCDOT: David Greene, Trudy Mullins, Tom Koch, Tim Sherrill, Michael Robinson

G/C PCI: John Beck, Reid Castrodale, Richard Potts

1. Box Beams

The status of box beam projects in the state was briefly reviewed.

The first projects are now being delivered. Box beams are favored by the hydraulic engineers and other agencies, so there is significant interest in using them. Design details have been finalized. Box beams are being used for spans less than 110 ft.

No action is required.

2. Deck Girders

The status of the Stanley County innovative deck girder bridge project was reviewed.

It was reported that the project had gone very well. The committee viewed photos of the bridge after girder erection, including some photos of welding of connections between girders. A final lift of asphalt and striping is all that remains to be done on the bridge. The bridge is scheduled for testing on Oct. 14 with opening on Oct. 15.

It was reported that the girders did not appear to require adjustment for differential camber.

It was noted that it appeared that the galvanizing was not removed before welding connections.

In the prebid meeting, contractors had expressed concern about the girders being top heavy and possibly unstable. It was clear from the photos that the contractor had braced the girders at the end bents.

The use of 0.5 or 0.75 in. thick elastomeric leveling pads rather than standard elastomeric bearings was discussed for cases when the ends of beams are cast into diaphragms, as for this bridge. This could improve stability by reducing the flexibility of the bearings.

Providing additional cover on the deck and grinding the surface to obtain the desired roadway profile was discussed as a possible option to avoid using an asphalt wearing surface.

The researchers are planning to give a presentation at the next Joint meeting. The final report will probably be completed some time in Spring 2006.

It was suggested that, for future projects, the fabricator could be allowed cast the deck and girder monolithically with a form that has properties equivalent to the girder as designed.

It was suggested that NCDOT write one or more articles on the project and consider submitting the project for the PCA and PCI awards programs. G/C PCI offered its assistance. The article could be the catalyst for creating interest in the development of a regional deck girder section.

No additional projects using decked girders are currently planned. However, in the right circumstances, they may be used again. It is expected that spans up to about 120 ft could be used, but the span may be limited by weight. It was mentioned that lightweight concrete could be used to reduce the weight where it is a limitation.

No action is required.

3. Cracking of acute corners on cored slabs

It appeared that this issue was raised because of repairs falling off of cored slabs prior to erection. If slabs are damaged, they are repaired prior to shipping.

Tom Koch indicated that Structure Design has been designing a few cored slabs with skews around 45 degrees, which are sharper than normally used. Slabs with this great of a skew are not frequently encountered.

It was suggested that a thin layer of compressible material should be placed on the bottom of the form for several inches at the point of a skewed slab to prevent initial damage at release.

Bearing details for skewed cored slabs and box beams were also discussed. One detail is to use a three pad or tripod system for bearings which eliminates the rocking. Reid Castrodale agreed to obtain and distribute information on this system developed in New England.

No additional action or future consideration is required.

4. Web splitting

Tom Koch reported that after internal discussions, NCDOT had decided to permit an allowable crack size for web splitting of about 0.010 in., although the size may vary with exposure conditions. The crack size limit is based on the crack widths mentioned in the draft PCI Repair Manual. For cracks greater than the allowable size, epoxy injection would be required.

It was agreed that web splitting cracks greater than the allowable size are uncommon. There was some concern about the measurement of cracks since new crack comparators do not show any sizes less than 0.010 in.

While not discussed at the meeting, a written policy regarding web splitting should be developed and distributed to the Technical Committee for review.

5. Deflection of girders on Knightdale Bypass

The status of the sagging girders on three spans of the Knightdale Bypass project was discussed. In one span, holes had been cored in the slab to drain water that was ponding on the structure.

Tom Koch presented some of the issues which the designers had indicated could have been responsible for causing the sag. These included:

- Poor predictability of cambers on long girders
- Reduced number of strands because of using structural continuity in design

It was reported that cambers were roughly half of what had been predicted. However, it was noted that the 74 in. MBT girders were erected within about 2 weeks after being cast. The field deflections when the deck was cast were apparently fairly close to what was predicted. It was agreed that, with a reasonable estimate of the deflection when the deck is cast, the intended deck elevations can usually be achieved even with reduced girder cambers if proper adjustments are made when setting screed elevations.

It was also noted that the additional weight of the buildup, caused by the reduced girder camber, would cause additional deflection of the girder when the deck was cast.

NCDOT indicated that they were not limiting the use of long prestressed concrete girders because of this situation because long girders have been used successfully on other projects, even when cambers were less than predicted.

No action or future consideration is required.

6. Review of number of strands in cored slab designs

Tom Koch reported that Structure Design had reviewed several of their cored slab designs and had compared them to designs obtained from SCDOT. They found that designs for the same spans performed by the two DOTs did not have significantly different numbers of strands. They did find that NCDOT did not allow tension in the cored slabs while SCDOT did allow tension, which would lead to some of the difference noted. For short slabs, it was also found that the NCDOT design program enforced a minimum of 12 strands.

It was agreed that the NCDOT Bridge Maintenance cored slabs may have more strands than designs by Structure Design. Trudy Mullins agreed to ask Bridge Maintenance about design of their cored slabs.

No action is required.

INFORMATIONAL / DISCUSSION ITEMS

7. Research

Tom Koch distributed a plan sheet showing the preliminary concept for a full-depth precast deck panel that they are proposing as an innovative bridge project. The panel would be used on steel girders, with studs in grout pockets to provide the composite connection. The panels would be pretensioned transversely and post-tensioned longitudinally. It was suggested, that a crowned slab might make transverse pretensioning difficult, and that the use of proper lifting devices could eliminate the need for the pretensioning. The project has not been accepted yet. The use of precast barrier rails was discussed, with John Beck agreeing to obtain and distribute SCDOT details to the committee.

An NCDOT research project on lightweight concrete girders and stay-in-place deck forms, which is in the list of projects distributed for proposals, was also discussed briefly. It was mentioned that lightweight concrete has been used in other states for girders and decks. It was also noted that a reduced density concrete with a blend of light- and normalweight coarse aggregates can be used to achieve necessary shipping weights.

8. Adjourn

The meeting was adjourned at approximately 4:00 PM.