# NC DOT / PCI Joint Technical Committee Meeting

Structures Design Conference Room C
January 6, 2005 1:00 PM

Submitted by
Reid Castrodale, Chair

**Attendees:**

**NCDOT:** David Greene, Tom Koch, Tim Sherrill

**NCDOT Guests:** Ron Hancock, Allen Raynor, Tony Davis, Brian Hanks, Gichuru Muchane, Derrik Hirschfeld

**G/C PCI:** John Beck, Reid Castrodale, Peter Finsen, Richard Potts, Chad Saunders, Jeff White

**G/C PCI Guests:** Kevin Bailey (RWA)

## 1. Introductions

Tom Koch and Reid Castrodale welcomed the attendees. Since there were guests, all present introduced themselves.

## 2. Deck Bulb Tees

Tom Koch gave a brief overview of NCDOT's deck bulb tee project and its status. A preliminary bridge layout, typical section and details were distributed. The bridge is located in Stanly County. This site was chosen for the first deck bulb tee bridge because it was 1 span, it was a good application because of high user costs, and because time savings are important. The Department has received IBRC funds from FHWA for this project. The Department is working toward advertising the bridge in the May letting. It was originally scheduled for an October letting. It is intended that construction be completed in a single construction season. Preliminary layout work is progressing with the expectation that design would be complete by mid-February in order to meet the schedule.

Reid Castrodale made a presentation on deck bulb tees, focusing on design details. G/C PCI agreed to the Department's request that a similar presentation be given at NCDOT's joint meeting with AGC on February 9, with an increased focus on field operations including erection, welding, leveling and grouting.

Reid Castrodale distributed two sets of sample deck bulb tee girder bridge plans. One set was prepared by a consultant and was accompanied by shop drawings, while the other set was prepared by the FHWA.

Various issues related to the design procedure and details were discussed, including:

- No structural design calculations have been run.
- The original design was for four lines of 63" deep modified bulb tee beams. Five lines of deck bulb tees (53" total nominal depth) will be used.
- The bridge layout will be changed to have a 90 deg. skew. The bridge length will not change.
- The bridge will probably receive a topping, which will most likely be concrete.

- The roadway profile is in a sag curve as it crosses the bridge, but the low point is not on the bridge. This raises some concerns regarding the topping requirements in the sag curve, which may be in excess of 6", considering a 2" minimum topping thickness, a 2" middle ordinate for the vertical curve, and a camber of at least 2".
- An 8" thick top flange is being assumed in the Department's design. It was noted that deck bulb tees in the northwest use 6" thick top flanges and that this has given good service over the years.
- The preliminary plans show a shear key with a square corner. It was recommended that the top of the shear key should be sloped toward the joint to improve the keying action.
- The Department indicated that they expected to require the beams to be assembled and match-marked in the plant. It was suggested that measuring beam cambers and developing an assembly scheme that minimizes differential camber may be more effective and economical than requiring assembly in the plant.
- It was suggested that the Department allow placing the deck concrete as a secondary pour after stripping the beam forms but before releasing the prestress force. This procedure would assist fabricators by allowing them flexibility in the production of this pilot project. A minimum concrete strength for form stripping would be specified, which would be less than the required strength at release. The Department expressed a preference for placing the deck concrete with the girder in a single pour. The development of vertical cracks in the girder, which would be exposed for an extended period prior to detensioning, was a concern.
- The Department anticipates that a standard slip-formed rail will be used.
- It was suggested that a build-up could be detailed or permitted above the beam to allow the fabricators to install cross-ties above the beam but below the deck. These ties are used to stabilize the forms.
- The Department agreed that the deck forms for this project could be plywood.
- The bridge is currently being detailed using steel diaphragms.

The Department indicated that they currently do not have plans for any additional deck bulb tee bridges. They are waiting to see how this initial project goes before proceeding with others. They currently feel that the best applications for deck bulb tees are one span bridges over a stream where a shallow depth of structure is required and where speed of construction is important. Another important application could be for emergency replacements.

It appears that the Department will not use a financial incentive for the contractor to complete this project rapidly because of the unusual nature of the construction. It is sometimes difficult to interest contractors to pursue new types of construction, so the Department does not want to place any other constraints on the contractors.

It was agreed that the Technical Committee will meet on the morning of February 16 at 10:00 AM to discuss the plans which should be complete by that time. The Department agreed to try to distribute the plans by February 11, so that they could be reviewed prior to the meeting.

**3. Shipping Permits**

Issues related to obtaining shipping permits were discussed. Recent difficulties were related.

The Department indicated that the Structure Design Policy allows 135 ft members to be shipped. The Department is working on internal procedures to facilitate handling of permits.

G/C PCI members agreed to collect examples of difficulties they have had in obtaining permits and bring them to the next Technical Committee meeting. A strategy will then be established to meet with the permitting and maintenance offices to clarify the needs and issues related to permits, including the use of rear-steering dollies. The Highway Patrol may also need to be involved since they are now responsible for regulating trucking in the state.

**4. Box Beams**

The material specified in the plans to form internal voids for the Richmond County box beam bridge was briefly discussed. A plan note specified use of a particular type of foam, which is more expensive than and has less strength than the expanded polystyrene (EPS) foam normally used to form voids in concrete products. It was also reported that a manufacturer of cardboard forms may start producing void forms. G/C PCI members will obtain additional information on void materials and bring it to the next Technical Committee meeting. Tom Koch also agreed to look into the issue.

It was also reported that Trudy Mullins had observed the casting of box beams with holes in the voids to assist in the proper consolidation of the concrete beneath the voids. As a result, the Department indicated that they would consider proposals to use holes in voids to assist in proper vibration for box beams.

**5. Web Splitting**

Discussion of this item was deferred to a later meeting.

**INFORMATIONAL / DISCUSSION ITEMS**

**6. Oregon Inlet (Bonner) Bridge**

Ron Hancock indicated that no decision has been reached on this project, but that more information may be available by the next Joint Committee meeting.

**7. Next Meeting**

As noted above, the next meeting will be at 10:00 AM on February 16 in the M&T Conference Room. This meeting is the same day as the next Joint Committee meeting, which will be at 1:30 PM in the same room.

**8. Adjourn**

The meeting was adjourned at approximately 3:20 PM.