

MINUTES OF DOT-AGC BRIDGE DESIGN SUBCOMMITTEE MEETING

(Approved: 06/08/2011)

The DOT-AGC Joint Bridge Design Subcommittee met on April 13th, 2011. Those in attendance were:

Greg Perfetti	State Bridge Design Engineer (Co-Chairman)
Mike Robinson	State Bridge Construction Engineer
Rick Nelson	Assistant State Bridge Management Engineer – Operations
Randall Gattis	Sanford Contractors, Inc.
Chris Britton	Taylor & Murphy Construction Co.
Larry Cagle	Thompson-Arthur Div., APAC-Atlantic, Inc.
Mark Johnnie	Balfour Beatty Infrastructure
Dan Nickel	Carolina Bridge Company
George White	Blythe Construction
Lee Bradley	Dellinger, Inc.
Erick Frazier	S.T. Wooten Corp.
Pete Weber	Dane Construction, Inc.
Brian Hanks	Structure Design Project Engineer
Paul Lambert	Structure Design Project Engineer
Scott Hidden	Support Services Supervisor – Geotech. Eng. Unit
Gichuru Muchane	Structure Design Engineer

The minutes of the October 13, 2010 meeting were reviewed and approved.

The following items of new business were discussed:

1. *Steel Diaphragm Fit-up on Modified Bulb-Tee Girders*

Mr. Perfetti stated that producers of prestressed concrete members have raised concerns with steel diaphragm fit-up for modified bulb-tee girders. The concern is that girders satisfying hole location tolerances outlined in the *Standard Specifications* may still have diaphragm fit-up problems. Mr. Perfetti inquired if Contractors have had any difficulty with diaphragm fit-up.

Contractors stated that in general they have had very few issues with diaphragm fit-up. They noted that on rare occasions they have welded the diaphragms in lieu of using bolted connections. There was some discussion on ways to provide additional assurance that the diaphragms could be installed with ease to prevent locked in stresses. Contractors suggested locating the girder tolerance for holes from the center of the girder rather than from the end of the girder. Other ideas included allowing field coring diaphragm holes, detailing larger holes in the girder, using smaller bolts in the existing holes, or providing larger slotted holes in the connecting diaphragm member.

The discussion noted that many of the suggested fixes were worse than the problem. There was consensus to begin showing tolerance dimensions to the diaphragm holes from the centerline of the girder (which requires a revision to the *Standard Specifications*) and continue addressing the rare fit-up problems on a case-by-case basis in the field.

2. *Total Dead Load Fit-up of Diaphragms for Steel Plate Girders*

Mr. Perfetti discussed the concept of total dead load fit-up for steel plate girders. He stated that Contractors will begin to see more steel bridges with the requirement for total dead load fit-up. He explained that the girders of skewed bridges tend to rotate out-of-plumb towards the acute corner when the deck is poured. Therefore, it will be necessary to erect the girders in an out-of-plumb position so that the rotation due to the girder and deck loads return the girder to the plumb position.

As such, during girder erection the girders and diaphragms may require some minor adjustments to align bolt holes.

Contractors expressed concerns regarding indicators for correct girder positions prior to pouring the deck, and inquired about the benefits of the requirement for total dead load fit-up.

Mr. Perfetti responded by stating that failure to erect steel girders for total dead load fit-up results in girders with locked-in lateral bending stresses and improper seating on bearings. Also, future inspections may raise concerns regarding the girder webs not being plumb.

3. *Working Drawings for Prestressed Girders*

Mr. Perfetti discussed the special provision for Prestressed Concrete Members in regard to the requirements for submittal of working drawings prior to casting the member. He noted that the special provision requires Producers of prestressed members show any attachments and inserts which will be cast into the girder, including provisions for fall protection and lifting loops, in the submittal.

Contractors inquired if a submittal for overhang falsework is necessary if the standard overhang falsework sheets are used. Mr. Perfetti responded by stating that only a partial submittal would be required and he noted that concurrent submittals for overhang falsework and the prestressed concrete members are acceptable.

4. *Temporary Bridges Over Railroads*

Mr. White distributed plans and pictures of a temporary two-span heavily skewed railroad overpass bridge. During construction of the temporary bridge the Contractor was informed that the owner of the railroad would require crash protection for a temporary bent and temporary towers that were proposed to be within 25 feet of the tracks. The Contractor provided the crash protection at considerable expense. Mr. White suggested that the required railroad clearance be addressed in the *Standard Specifications* or special provisions for future projects.

5. *Alternative End Bent Design*

Mr. White distributed details for integral abutment bridges. He briefly discussed the construction process using the details, which he thought were a viable alternative to the details currently used on integral abutment bridges in North Carolina.

Mr. Perfetti stated that Structure Design will review the details for possible adoption or integration into the standard details for integral abutments.

6. *Bridge Management Pre-Let Meetings*

Mr. Weber stated that in the past pre-bid meetings for projects let by the Bridge Management Unit were held at the Division office, which facilitated scoping the job site on the same day. He noted that now pre-bid meetings are held in Raleigh, which is time-consuming for Contractors because scoping the job site cannot be accomplished on the same day.

Mr. Nelson responded by stating that the Bridge Management Unit (BMU) historically administered most of the Purchase Order Contracts (POCs) and they were able to hold pre-bid meetings at the local Division office. However, he noted that as ARRA and MOE initiatives increased BMU's workload the pre-bid meetings were moved to Raleigh for efficiency. He added that POCs have transitioned to Division let projects, which will be administered by the Division offices, and therefore in the future the pre-bid meeting will move back to Division offices.

There was some discussion on ways to address the concern raised by Mr. Weber for the outstanding POCs. Contractors suggested eliminating the pre-bid meetings for the remaining POCs, and noted that their questions and BMU's responses can be handled via email or conference calls. Mr. Nelson noted that BMU is reducing the number of monthly lettings to one, which would support electronic

plan requests and delivery. He stated that he would discuss the suggestions with the State Bridge Management Engineer and send notification on the letting process for the outstanding contracts.

7. *Maximum Span Lengths for Prestressed Members*

Mr. Gattis stated that engineering Consultants of design-build teams sometimes extend girder lengths beyond the span lengths suggested in the Structure Design Manual. He inquired if this practice presented a problem for the Department.

Mr. Perfetti stated that the spans lengths in the Design Manual serve as a reasonable guide to the other disciplines involved in the preliminary bridge layout process and are by no means absolute maximum spans. He noted that he recently discussed this issue with Mr. Rodger Rochelle. If design-build teams feel there is a benefit to go beyond standard practice, they are encouraged to explain the motivating site specific reasons and any innovative engineering techniques that would be needed to do so. The members of the Technical Review Committee are then able to evaluate accordingly.

Mr. Hanks pointed out that, from a Bridge Management perspective, there is a benefit for some allowance for deterioration or damage over the 75 year design life of the structure.

Mr. Muchane mentioned that for in-house projects material savings can often be offset by engineering costs, and therefore design engineers strive to achieve a balance between the two, which may lead to differences in span lengths.

8. *Deck Rideability*

Mr. Robinson stated that the FHWA has suggested the Department enhance the bridge deck rideability requirements. In response, the Department is considering reducing the bridge length for requiring a profilograph test from 1,500 ft. to 1,000 ft.

During the discussion Contractors inquired if the approach roadway would have any rideability requirements and they suggested the Department consider employing other methods for evaluating bridge deck rideability.

9. *Precast Bent Caps*

Mr. Hanks briefly discussed the FHWA "Every Day Counts" initiative. This initiative identifies prefabricated bridge elements as a technology that can shorten project delivery and reduce environmental impacts. As such, Structure Design is developing standard prestressed precast bent and end bent caps to be used in conjunction with the precast cored slab standard plans. He noted that prestressing the bent cap will facilitate reducing the weight of the precast caps. He added that the Georgia/Carolinas PCI suggested limiting cap widths to 3'-0" so that forms used for box beams and cored slabs may be used to produce the precast caps.

Contractors inquired about the connections between the piles and the caps. Mr. Hanks responded by stating the connections would be created by extending the piles into grouted pockets formed in the caps.

During the discussion Contractors suggested limiting the cap weight to 20,000 lbs. The Contractors also expressed concerns with pile driving tolerances, and they noted that without sufficient volume, construction with precast elements may reduce construction time, but not the project cost.

10. *Foundations for Sound Barrier Walls with Concrete Piles*

Mr. Hanks displayed preliminary details of foundations for sound barrier walls with concrete piles. He noted that concrete pile dimensions will be 1'-6" x 1'-6" and therefore the diameter of the pile excavation will need to be 3'-0" for single piles and 4'-6" where two adjacent piles are required for bends/turns in the sound barrier wall. Mr. Hanks inquired if the larger diameter pile excavation could be performed with standard augers and light drilling equipment.

Contractors responded by stating that it is preferable to use the smallest possible diameter pile excavation. They also suggested contacting producers of precast concrete products to inquire about alternate ways of forming bends in sound barrier walls using a single pile. During the discussion Contractors noted that sound barrier walls panels with exposed aggregate are very expensive and they inquired about alternatives, especially with regard to sound barrier products often marketed by salesmen or plain concrete finishes. Mr. Hanks noted that the special provision for Sound Barrier Walls will sometimes allow an alternate wall type that has been approved by the Product Evaluation Program. Mr. Robinson added that sound barrier wall panels with an aesthetic finish created by use of a form liner have been used on past projects.

11. Next Meeting

The next meeting is scheduled for Wednesday, June 8, 2011 in the Structure Design Conference Room.