MINUTES OF AGC-DOT JOINT BRIDGE SUBCOMMITTEE MEETING
(Approved: 8/20/14)

The AGC-DOT Joint Bridge Subcommittee met on June 11th, 2014. Those in attendance were:

Greg Perfetti	State Structures Management Engineer (Co-Chairman)
Berry Jenkins	NC Gov't Relations, Hwy. Division Director; Carolinas AGC (Co-Chairman)
Ron Hancock	State Construction Engineer
Kevin Bowen	State Bridge Construction Engineer
Brian Hanks	Assistant State Structures Management Engineer
Bill Heston	Balfour Beatty Infrastructure, Inc.
Lee Bradley	Blythe Construction, Inc.
Chris Britton	Buckeye Bridge, LLC
Eric Misenheimer	Chandler Concrete
Ben Bishop	Crowder Construction Co.
Adam Holcomb	Dane Construction, Inc.
Chris Powers	Lee Construction Co. of the Carolina, Inc.
Kevin Burns	R. E. Burns and Sons Co.
Randall Gattis	Sanford Contractors, Inc.
Chris Brown	Sanford Contractors, Inc.
Erick Frazier	S. T. Wooten Corporation
Larry Cagle	Thompson-Arthur Div., APAC-Atlantic, Inc.
Cynthia Van Der Wiele	United States Environmental Protection Agency
Scott Hidden	Geotechnical – Support Services Supervisor
Chris Kreider	Geotechnical – Eastern Regional Operations Engineer
Owen Cordle	Materials and Tests – Physical Testing Engineer
Jack Cowsert	Materials and Tests – State Materials Quality Engineer
Cabell Garbee	Materials and Tests – Field Operations Engineer
Brian Hunter	Materials and Tests – Chemical Testing Engineer
Darren Scott	Materials and Tests – Structural Members Engineer
Dan Muller	Structures Management Project Engineer
Paul Garrett	Structures Management Project Engineer
Todd Garrison	Structures Management Engineer (Subcommittee Secretary)

1. *Approval of Minutes*

   The minutes of the October 16, 2013 meeting were approved.

2. *Alternate Integral End Bent Details (continuation from October 2013 meeting)*

   Mr. Heston proposed Structures Management provide a permitted vertical construction joint between the integral end bent diaphragm and the upper portion of the wing wall. This option would be applicable to integral end bents detailed with the integral diaphragm extending the entire length of the end bent cap. He suggested that the permitted joint would allow the Contractor to build the upper portion of the wing wall prior to building the integral end bent diaphragm. As a result, the approach slab could be poured simultaneously with the bridge deck end closures.

   Structures Management will investigate alternate details for the integral end bent diaphragms.

3. *Skewed Approach Slab Concrete Quantity (continuation from October 2013 meeting)*

   Mr. Tutterow was unable to attend the meeting. Therefore, discussion of this item was postponed.

4. *Proposal to Change Horizontal Measurements on Plans*

   Mr. Tutterow was unable to attend the meeting. Therefore, discussion of this item was postponed.

5. *Payment of Walls*

   Mr. Cagle expressed concern over the payment of gravity and MSE walls. In the past, the bid price for walls was lump sum, but was changed to area of exposed wall. This makes bidding difficult since wall embedment is unknown. Mr. Hidden stated that the minimum amount of wall embedment is based on the wall design. He addressed the difficulty for wall design engineers to estimate the area of the wall based on various minimum embedment depths.

   The Geotechnical and Construction Units will investigate changes to current method of wall payment.

6. *Disposal of Grooving Slurry*

   Mr. Gattis stated that disposal of slurry from grooved bridge decks is an environment concern. There is a renewed focus on Article 420-14(B), where all residue from the grooving operation must be disposed off the project. Sanford decided to pursue disposal of grooving slurry on the Goldsboro Bypass through our statewide permit. This permit was issued in April 2013 and is for diamond grinding slurry, and hydrodemolition slurry, but we are also being allowed to use it for bridge deck grooving slurry. Mr. Brown stated that the PH level and metal concentration are tested and that a PH level of 12.5 is considered hazardous. He said that acid can be added to achieve an acceptable level. He also discussed different methods of disposal. One method is to collect the slurry and spread it at an agronomic rate over vegetated areas, or potentially on the grade. ST Wooten was approved to dispose of the slurry at a concrete plant. Another method is to bury the solids in an embankment, if the water can be properly disposed of, or evaporates. Sanford has pursued this method by collecting the slurry in a lined, earthen basin, and allowing the water to evaporate. Mr. Gattis expressed that this disposal process was not as big of a deal as originally thought when they looked at the permit requirements. Smaller projects may be a bigger challenge if there is no room for a basin.

7. *Report of Mass Concrete on Goldsboro Bypass Project*

   Mr. Gattis and Mr. Brown shared details and pictures of their recent experience with mass concrete in Goldsboro. The concrete elements requiring mass concrete were hammerhead bent footings. Mr. Gattis noted that the footing concrete did not reach the maximum temperature until 3 days after the pour and did not cool to a temperature below 100 degrees for 14 days. Mr. Gattis and Mr. Brown stated that the consecutive temperature decrease requirement and the maximum internal temperature limit are difficult to achieve; in general, the mass concrete process is extremely time consuming and future issues are anticipated.

   Mr. Gattis stated that a possible way to alleviate these issues is to remove the forms for the mass concrete elements during the hottest part of the day. This would result in less thermal shock and quenching effect to the concrete.

   A research project with North Carolina State University is currently underway that will provide guidelines for mass concrete. Structures Management will discuss the results with the Contractors when the research is complete.

8. *Fly Ash Mix Design Issues*

   Mr. Misenheimer reported on the limited use of coal due to current EPA guidelines, which results in a limited supply of fly ash produced during coal combustion. He stated that fly ash sources are stored in a database and approval is granted or denied on a case-by-case basis. Also, the allocation of the material is highly variable; allotments are distributed weekly. As a result, a large number of concrete mixes are comprised of cement without the fly ash pozzolan.

Mr. Misenheimer mentioned that the quality of the fly ash diminishes as the supply decreases. Also, due to lack of or poor quality of fly ash in the concrete mixes, issues such as air entrainment are anticipated for Contractors and Ready-Mix Producers.

The Materials and Tests Unit will hold internal discussions about fly ash sources.

9. *HRWR for Silica Fume Mixes*

Mr. Misenheimer stated that the Project Special Provision for mass concrete limits the concrete slump to 3 inches. He also stated that other Project Special Provisions that pertain to corrosion protection limit the slump to 3.5 inches. With silica fume incorporated in these mixes, superplasticizers, also known as high-range water reducers (HRWR), will be required. Mr. Misenheimer noted that it is difficult to achieve and retain this very low slump with the use of HRWR and went on to say that a 3 inch slump limit with HRWR is nearly impossible. Currently, concrete mixtures including HRWR with an increased slump allowance, are approved or denied by Mr. Cordle on a case-by-case basis. Mr. Misenheimer suggested an allowance of 6.5 inches to 8 inches slump on all of these mixes and indicated that 9 inches slump is excessive.

Structures Management and Materials and Tests will collaborate to modify the Project Special Provisions.

10. *Purchase of American Material*

Mr. Cowsert stated that the Federal Highway Administration is requiring state governments to purchase steel and iron material from American manufacturers. He provided a list of steel and iron structural components that qualify under this federal requirement.

Mr. Cowsert also described criteria for certain exemptions to this federal requirement. He stated that if the total cost of all foreign material delivered for use on a project is less than the greater of $2,500 or 0.1% of the total contract price, then the foreign material would be acceptable for use on the project. He informed the Contractors that the Resident Engineers will keep track of the total contract bid amounts and the allowable foreign material amounts on an exemption form, in which he provided as an example.

Mr. Cowsert will serve as the point of contact to ensure Contractors abide by the FHWA "Buy America" requirements.

11. *Cored Slab Post-Tensioning Jack Calibration*

Mr. Bowen stated that the jacks used for post-tensioning strands on cored slabs and box beams must be calibrated by a certified testing facility every 12 months. He noted that Contractors must provide a calibration certificate, the test results table depicting pressure or tensile force, and jack information/specifications. These specifications should include the effective area of the cylinder. The target post-tensioning pressure should be determined by dividing the required tensile force of 43,950 pounds (for 0.6 inch diameter strands) by the cylinder effective area; this applied pressure should be verified on the pressure gauge. He also stated that Contractors should check the jack maximum stroke prior to tensioning; a maximum stroke could result in false tension readings.

Mr. Bowen also mentioned that the Contractors must use a reaction frame to allow workers access to set the wedges after tensioning the strands. He stated that the reaction frame drastically reduces the cracking previously noted in the shear key between the exterior unit and the adjacent interior unit. Also, if a strand is tensioned after the wedges are set, the forces from the jack ram on the wedges cause friction on the strand and tension is only developed between the wedges and the strand vise behind the jack. This results in the improper tensioning of the strand in the region within the cored slab or box beam. Therefore, tensioning against the wedges will not be allowed.

Mr. Bowen stated that if Contractors notice in the field that an exterior cored slab or box beam unit is uplifting during post-tensioning, relax the pressure on the jack to lower the unit back onto the bearing pad before setting the wedges and cutting the strand. The use of steel shim plates under the slab or box beam to solve this problem is not preferred. We can pursue other options to solve the lift off problem if it is caught before the beams are post-tensioned, the strands cut, and the shear keys grouted. One potential solution is to partially tension the strand, grout the exterior shear keys, and then fully tension the strand after the grout achieves 5000 psi.

12. *Additional Integral End Bent Concerns*

Mr. Bowen discussed cracking issues that have been noted in the field for integral end bents. On some projects, after the integral abutment diaphragms were poured and the forms removed, vertical cracks were present along the fill face in locations corresponding to the ends of the girders. He also noted that the cracks appear to be more prevalent on bridges with steel girders versus concrete girders, possibly due to the larger amount of thermal movement accompanying longer span lengths. We have been unable to see these cracks on integral end bents built with fabric walls behind the cap, which serve as the fill face form for the concrete.

13. *Internal Curing Special Provision*

According to ACI 2010, internal curing is defined as "supplying water throughout a freshly placed cementitious mixture using reservoirs, via pre-wetted lightweight aggregates, that readily release water as needed for hydration or to replace moisture lost through evaporation or self-desiccation". Mr. Bowen discussed a test project in which an internal curing process will be implemented and monitored in the bridge deck. The project, B-5136 in Cabarrus County, is a three-span bridge over a railroad; the end spans will contain concrete girders and the center span will contain steel girders. The bridge will be stage-constructed; the deck on one stage will be constructed using normal concrete curing practices, and the deck on the other stage will be constructed using an internal curing process. The curing will be monitored during construction of both stages for comparison.

14. *Next Meeting*

The next meeting is scheduled for August 20, 2014 in the Structures Management Conference Room C.