

## MINUTES OF DOT-AGC BRIDGE DESIGN SUBCOMMITTEE MEETING

The DOT-AGC Joint Bridge Design Subcommittee met on May 29<sup>th</sup> 2002. Those in attendance were:

Greg Perfetti	State Bridge Design Engineer (Co-Chairman)
Berry Jenkins	Manager of Highway Heavy Division, Carolinas Branch AGC (Co-Chairman)
Ron Shaw	Lee Construction Company of the Carolinas, Inc.
Michael Dane	Dane Construction, Inc.
Kevin Burns	R. E. Burns & Sons Co.
Richard Holshouser	Sanford Contractors, Inc.
Ron Hancock	State Bridge Construction Engineer
Tom Koch	Structure Design Project Engineer
K J Kim	Soils and Foundation Engineer
Paul Lambert	Structure Design Project Engineer
Mohammed Mulla	State Soils and Foundation Engineer
Jay Bennett	State Roadway Design Engineer
John Erwin	Structure Design Project Design Engineer (Secretary)

The following items of business were discussed:

1. The minutes of the March 27<sup>th</sup>, 2002 meeting were accepted.
2. *Precast Box Culvert Update*

Mr. Hancock stated that the Precast Box Culvert Task Force had recently met and finalized a special provision governing fabrication and construction of precast box culverts. This special provision will be considered "draft" until several trial culverts have been constructed under the new criteria set forth in the special provision. At that point, modifications could be made based on results of fabrication and construction of the trial culverts.

Mr. Hancock stated that the new special provision establishes criteria for internal joints and external joint wraps, fabrication tolerances, box fit-up testing, and foundation requirements. Mr. Shaw inquired if this special provision would govern precast culverts across the state or just precast culverts constructed in certain geographical areas. Mr. Hancock stated that the foundation requirements may vary depending on geographical area but all other criteria addressed in the special provision will apply statewide. However, the foundation requirements for a specific region of the state will apply to both precast culverts as well as cast in place culverts.

Mr. Hancock stated that he is currently looking for projects to consider under the new special provision. Structure Design committed to search for available projects.

### 3. *Barrier Rail Transition*

A FHWA crash-tested barrier rail transition, designed by Minnesota DOT, was distributed to committee members for comments at the 3/27/02 meeting. Mr. Erwin reported that after further research and discussion, NCDOT would continue to use the current barrier rail transition in lieu of changing to the Minnesota DOT transition.

Mr. Erwin stated that the Minnesota DOT detail transitioned from a standard curb to an F-shape barrier rail. Therefore, the geometry of the transition was difficult to adapt to NCDOT's shoulder berm gutter to a New Jersey shape barrier without sacrificing the integrity of the original crash tested transition. Mr. Hancock also added that the current barrier rail transition allows a standard guardrail attachment on all four corners of the structure.

Mr. Erwin also stated that the standard New Jersey shape barrier rail would be increased in thickness by 1" in order to increase the cover over the reinforcing steel in the back of the barrier rail. By decreasing the slab overhang beyond the barrier rail from 1 1/2" to 1/2", increasing the cover could be accomplished without increasing the bridge width. Mr. Holshouser stated that the 3/4" chamfer on the back overhang would have to be decreased or removed if the overhang was reduced to 1/2".

Mr. Hancock stated that one project has been constructed with the new barrier rail transition. The contractor chose to slip form the full length of the rail and carve the transition out of the standard shape. Mr. Hancock stated that this was relatively effective but recommended forming the transition in the future to maintain consistency in appearance from transition to transition and from site to site.

### 4. *Rideability Specification*

Mr. Erwin distributed a draft rideability special provision to the committee for review and comments. General requirements of the rideability special provision are as follows:

- The rideability special provision shall be included on all bridges with decks greater than 1500' in length
- All travel lanes shall be tested with a Rainhart Profilograph
- The testing shall be performed by an independent provider approved by the Engineer
- The maximum allowable profile index shall not exceed 6" per mile
- If the allowable profile index is exceeded for a given test section, the full width of all lanes and shoulders in that direction of travel throughout the test section shall be planed parallel to the longitudinal roadway centerline.
- If a substantial amount of deck has been planed, the Engineer may delete the requirement for grooving.
- Testing and planing of the bridge surface shall be considered incidental to the contract bid price for "Reinforced Concrete Deck Slab"

Mr. Jenkins stated that the special provision needed to be as specific as possible especially when defining the actual test limits and how the joints affect the profile index. Mr. Shaw stated that South Carolina DOT uses a bump meter that measures the bump at a joint and calculates a reduction factor that is accounted for within the profile index. Mr. Jenkins stated that Mr. Tom Hearne of the Pavement Management Division was very knowledgeable on the Rainhart Profilograph and should be faxed a copy of the draft special provision for review and comments.

Mr. Jenkins inquired if the contractor could perform the profilograph test. Mr. Hancock stated that the special provision was written to require an independent testing agent. However, in the future, consideration may be given for allowing the contractor to perform the testing.

Mr. Shaw stated that the special provision should be more specific in explaining what amount of deck planing would allow the elimination of bridge grooving. Currently, the special provision states that “if a substantial amount of bridge deck has been planed, the Engineer may delete the requirement for grooving.” Mr. Hancock stated that “substantial” refers to how much thickness is removed rather than area of bridge deck. The intention of the special provision is to eliminate grooving after planing  $\frac{1}{2}$ ” of the deck surface, which would greatly reduce concrete cover over the deck slab reinforcement.

Mr. Shaw questioned if deck planing would be paid for as texturing. Mr. Hancock answered that testing and planing would be considered incidental to the bridge deck, which would hopefully encourage good workmanship. Mr. Perfetti stated that an attempt would be made to clarify the provision with respect to the items discussed.

##### 5. *Vertical Grades on Temporary Bridges*

Mr. Hancock reported that over the past months, there have been an increasing number of temporary bridges designed with vertical curve grades. Mr. Hancock stated that temporary bridges could be constructed with minor vertical curves by using varying depths of asphalt over the length of the structure. However, with larger vertical curves, the contractors have to resort to other methods to satisfy the grade requirements on the temporary bridge. Often times the contractor will build fabric walls or utilize other methods to increase the approach grade on one side of the temporary structure to create a tangent grade across the structure.

In addition, Mr. Hancock stated that in some instances the horizontal clearance to the existing structure is not adequate for a given type of prefabricated temporary bridge. Typically, 5’ of horizontal clearance to the existing structure is adequate for constructing a new structure but 10’ may be necessary for a temporary structure. Mr. Hancock stated that a lack of horizontal clearance should not prevent the contractor from using a certain type of prefabricated temporary bridge. Mr. Shaw stated that horizontal clearance often becomes an issue when temporary structures are located in a horizontal curve. The structure must be wider to accommodate the curve and therefore requires greater horizontal clearance. Mr. Holshouser also stated that since the

substructure is always wider than the superstructure, the horizontal clearance should be set from the outside edge of the substructure units during the design process.

Mr. Bennett responded that due to new environmental concerns, the temporary structures are required to be longer and therefore tangent grades and alignments are difficult to maintain. Furthermore, temporary bridge construction issues definitely need to be addressed during the roadway design process. Mr. Bennett stated that the roadway designers need to be informed of all construction issues related to temporary structures. In doing so, the preliminary design assumptions used in permit applications can include criteria for a constructable temporary structure. Mr. Perfetti agreed that a set of criteria relating to design and construction of temporary structures would be helpful, and Mr. Lambert agreed to work with the Roadway Design Unit in developing the criteria.

## 6. *Drilling Slurries*

Mr. Hancock inquired about the differences between polymer and bentonite slurries. Mr. Mulla stated that there were positive and negative qualities of both slurry types. The polymer slurry generally provides more shaft friction than the bentonite slurry because there is no formation of a mud cake along the shaft walls. However, the side surfaces of the shafts are not as stable with polymer slurries and therefore a considerable amount of sediment clean-out from the bottom of the shaft is required. In addition, Mr. Mulla stated that typically, polymer slurries are more environmentally friendly and less expensive than bentonite slurries. However, polymer slurries are only effective with certain types of soil. Mr. Mulla stated that polymer slurries are typically most effective in dense and cemented sands and with most soils that have blow counts of 50 or greater. Polymer slurries are least effective with silts and clays and with any soil profile that contains silt seams.

Mr. Mulla stated that the Soils and Foundations Unit has not allowed the widespread use of polymer slurries due to the numerous types of polymers available as well as the uncertainty of how each one performs with different soil types. However, Mr. Mulla stated that after the project is awarded, the contractor may propose using a polymer drilling slurry and the Soils and Foundation Unit would consider it on a case by case basis.

## 7. *Other*

### *i. Shear Stud Requirements*

Mr. Hancock stated that he and Mr. Holshouser had recently attended a Rules Review Commission meeting regarding shop welding shear studs on steel girders. Mr. Hancock reported that the proposal to allow shop welding of shear studs received approval and will be presented to the legislature.

### *ii. Precast Culverts vs. CIP Culverts*

Mr. Burns questioned if a contractor could construct a cast-in-place culvert when a precast culvert is detailed on the plans. Mr. Koch stated that the only time the Structure Design Unit requires precast culverts is when there are specific time constraints governing the culvert construction. Mr. Perfetti stated that substituting a cast-in-place culvert with a precast culvert would be acceptable as long as the time requirements were met and there is no additional cost for NCDOT. Mr. Burns stated that a cast-in-place culvert could often be done faster and cheaper than a precast culvert. Structure Design committed to include a note in the plans to allow the contractor to substitute a cast-in-place culvert for a precast culvert provided that time constraints are satisfied and there is no additional cost to the Department.

*iii. Railroad Flagging*

Mr. Holshouser asked if a new specification had been written requiring the contractor to be responsible for railroad flagging. Mr. Perfetti stated that there was not a new specification but the current specification does put the burden of scheduling railroad flagging on the contractor. Mr. Holshouser stated that in the middle of a project the flagman will often be required to attend an offsite meeting or training seminar which shuts down the project until the flagman returns. There is seldom a replacement provided and there are no other options than to stop work until the flagman returns. Mr. Perfetti stated that if a contractor has continued difficulties scheduling a railroad flagman, contact the Structure Design office for assistance.

Mr. Holshouser also stated that in most cases when a bridge replacement project is awarded, the contractor desires to remove the existing bridge immediately. However, the removal methods must be submitted through the Resident Engineer's office, the Structure Design office, the Railroad office, and possibly the railroad's consultant. Mr. Holshouser stated that this procedure delays the project and questioned if the bridge removal procedures could circumvent the Resident Engineer's office and be a direct submittal to Structure Design. Structure Design committed to making the necessary changes in the Submittal of Working Drawings special provision.

*iv. Base Course under Approach Slabs*

Mr. Hancock asked if it would be feasible to eliminate the requirement of a base course of ABC stone, HB asphalt, or concrete when reinforced approach fills were specified. Mr. Burns questioned if the density requirements would differ. Mr. Hancock stated that the density requirements would remain the same as for the base courses. Mr. Hancock stated that he would send out a detailed memorandum describing the changes. Structure Design committed to making the necessary revisions to the standards.

*v. Location Sketch/Foundation Layout*

Mr. Perfetti asked the Committee's thoughts on removing the Location Sketch and the Foundation Layout sheets from the structure plans. The Location Sketch no longer shows utility details and discrepancies are frequently found between the Foundation Layout and Bent Sheets. Mr. Shaw and Mr. Burns stated that they used these sheets

frequently and requested that they remain. Mr. Perfetti concluded that these sheets would remain in the plans.

*vi. Steel Plate Lengths*

Mr. Perfetti mentioned that the State's Permit office was willing to look at changing policy to allow increased shipping lengths for steel plate girders. Currently, Structure Design limits steel plate girder sections to a maximum length of 120'. However, adjacent States detail longer plate girder sections and fabricators are given permits to ship the longer sections to those States. Mr. Perfetti asked the committee if they had a preference. The contractors stated, in general, that they did not have a preference but recommended contacting the fabricators and receiving their comments prior to any actions. Structure Design committed to discussing the topic with the steel fabricators.

*vii. Use of Subcontractors*

Mr. Jenkins mentioned that starting with the September letting, DOT is requiring a Safety Prequalification Index for subcontractors. Mr. Jenkins has approached Steve Dewitt about providing a list of those contractors that are prequalified.

*viii. Next Meeting*

The next meeting is scheduled for July 24<sup>th</sup> at 10:00 a.m. in the Structure Design Unit Conference Room C.