

**KYTC Divisions of Construction/Structural Design/Quality Assurance
and
ACEC Bridges, Inspection & Design Sub-Committee
Partnering Meeting**

Thursday, November 21, 2014, 10:00 AM – 12:00 PM

Minutes

These minutes provide an outline of discussions at the Division of Construction, Structural Design, Quality Assurance Branch, and ACEC Bridge Sub-Committee partnering meeting held at the Transportation Cabinet Office Building. Those in attendance were:

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| Mark Walls | Division of Construction (DOC) |
| Danny Jasper | Division of Construction |
| Vibert Forsythe | Division of Construction |
| Adam Ross | Division of Construction |
| Brent Sweger | Quality Assurance Branch (QAB) |
| Shawn Russell | Quality Assurance Branch |
| Anthony Norman | Quality Assurance Branch |
| Bill McKinney | Division of Structural Design (DOSD) |
| Kevin Sandefur | Division of Structural Design |
| Doug Burton | Lochner |
| Derek Barnes | Parsons |
| John Broadus | HDR |
| David Depp | Johnson, Depp & Quisenberry |
| Scott Ribble | Burgess & Niple |

Discussion topics included:

- 1. Purpose** – This meeting was requested by the Sub-Committee in order to bring the Division of Construction and the Quality Assurance Branch into the dialogue that’s been ongoing with Structural Design. The goal is to exchange feedback on design/construction issues that could be addressed/avoided in future projects, resulting in more economical, easier to construct, and longer lasting bridges.
- 2. Division of Construction Discussion Topics**
 - a) Danny Jasper mentioned several recent bridges where excavation was required to construction one span of a three span, lending him to believe that the bridge was longer

than needed and didn't fit the site. The group discussed the possibility of hydraulic opening requirements or scour controlling the span lengths.

- b) Vibert asked about the 120 day maximum requirement for casting beams. Recently contractors have asked about changing or removing the requirement. The group discussed that doing so could increase the potential for beam/deck reinforcement conflicts and grade changes due to excess camber growth. For some projects with a large number of beams and/or lengthy staged construction, where the beams are expected to exceed the 120 day requirement, the designer may want to consider allowance for additional camber when setting the beam seat elevations, etc.

3. Follow-up from Last Meeting

- a) MSE wall study – No study has been performed regarding but DOSD policy continues to not allow spread footings on soil behind MSE walls but consideration can be given to pile bents behind walls if needed for R/W or similar issue. Bill recommended the piles to be encased in pipes. Brent mentioned the use of GRS abutments, currently being promoted by FHWA, and a GRS project that will be in the upcoming QAB newsletter.
- b) Masonry coating study – No recent study has been completed but Kevin mentioned an older test case at the E/W Connector. A new study, potentially initiated by QAB thru KTC, would provide more up-to-date concrete finish options. The group discussed the need of sealant vs coverage for aesthetics. Bill mentioned the Division of Maintenance is not a supporter of masonry coating.
- c) Spec changes for pile changes from DOSD – Recently DOSD released new recommendations and base sheets for friction using the Gates formula. The KYTC Standard Specifications currently call for the use of the ENR formula. Since the Gates formula will be used going forward, DOC agreed to update the specs during the next update. The Gates formula will be spec'd in the plans sheets until the Specifications are updated.

- 4. Maximum grade for deck pour** – Recent design projects in eastern Kentucky have required steep grades (or grades + x-slope). The sub-committee asked if there was a maximum before problems arise in pouring the deck. DOC sated that contractors have not had any issues in the past. DOSD mentioned an 8% max which is primarily for safety under sub-freezing conditions.

- 5. Skewed screed lines for construction elevations** – Typically construction elevations are given along lines that are orthogonal to the baseline, regardless of bridge skew. For a typical straight but skewed bridge this means that the screed line is at a different point on adjacent

girders. Some consultants in Kentucky have been skewing their screed lines to be parallel to the substructures, which is a standard approach used in several other states. From a constructability standpoint, which method is preferable for DOC or contractors? DOC has no preference.

- 6. Skewed transverse reinforcement** – Typically, the transverse bars in the deck are placed orthogonal to the baseline even for small skews. AASHTO 9.7.1.3 allows bars to be placed parallel to the skew for skews that do not exceed 25 degrees. Skewing the reinforcing would require a slight increase in total steel required (up to a max of 10% additional steel at 25 degrees), but would allow all of the transverse reinforcing to be the same length and eliminate the triangular area of variable length bars at each end. From a constructability stand point, would skewing the transverse reinforcing for skews 25 degrees or less yield any measurable cost and/or project accounting savings? It would definitely simplify plan detailing and development of bar schedules for many bridges with smaller skews. The group discussed the potential for conflict with the stirrups and shear studs at the top of the beams. Also, the savings in labor maybe somewhat offset in the additional steel required. The group reached the conclusion that using skewed reinforcement may only be viable on smaller skews (< 10 deg) and when PPC-beams are used (due to the wider stirrup spacing).
- 7. Deck slope under barrier** – Exhibit 601 of the Guidance Manual indicates the top surface of the deck shall be level underneath the bridge barrier with the bottom slope of the deck being parallel to the deck cross slope, resulting in a variable thickness within the barrier limits. Designers often show the top and bottom surface of the deck to be level on the high side in order to maintain a minimum deck thickness with the transverse reinforcing steel being bent at the face of the barrier. In practice, what are the contractors actually building? DOC stated that contractors never bend overhang deck bars and typically continue the cross slope beneath the barrier. Since that's the case, the group agreed that it's more prudent to show the deck following the cross slope in the plans and provide deck elevations at the outside face of the barrier (vs the current policy of the inside face) as long as the inside barrier height dimensions are maintained.
- 8. Full size vs half sizes** – 22" x 36" Full Size plan sets are still the official deliverable. Some bridge plan sets are being developed using larger fonts to make half-size plan sheets more readable. DOSD uses the larger font (0.14" for full size sheets). Others use smaller fonts based on full-size plan sheets, resulting in more information being presented on a given plan sheet. What size plans do contractors typically use to build bridges? DOC stated that contractors typically use an 11"x17" set but will have a full size set on-site if needed. The group discussed possibly using 22"x34" full size plan sheets which could easily be scaled to

11"x17" for a true half size. The 22"x34" sheet could be printed on a 22"x36" plan sheet since Highway Design still requires its use.

- 9. Type 2 vs Type 14 stirrups** – The group discussed the use of two Type 2 (U-bars) vs a single Type 14 (closed stirrup). Type 14 bars required multiple bar calls in the variable cap section. Two type 2's could be used to simplify bar calls and to allow the contractor to drop the longitudinal bars into rather than feed them thru the Type 14s. The biggest disadvantage of the type 2s is the additional steel required due to the lap between. The DOC has no issues using the Type 2s but didn't have a feel for the potential construction savings.
- 10. Recent use of steel pipe piles** – Has DOC seen any installations of steel pipe piles under the new criteria (Gates) and have there been any problems? DOC has limited experience with pipe piles, predominately District 1 and 2, but was unaware of any problems.
- 11. As-builts** – Who is currently handling as-builts? How was it handled on ORB? DOC stated that field staff typically make needed changes but the methods (CADD, hand sketches, etc.) are not consistent. Also, it's unknown if those changes are always echoed to the final archived plan set. The sub-committee stated the importance of accuracy in the as-builts especially for load ratings or rehab projects. DOC is working on developing a consistent policy (preferably CADD). No one at the meeting for DOC was familiar with the ORB as-built policy.
- 12. Construction issues and Post Design services** – What's the standard operating procedure when a problem arises during construction? DOC typically contacts DOSD which handles smaller issues and cc's the EOR on the recommendations. If a larger issue arises, DOSD will contact the EOR directly. However, there's not currently a mechanism for payment for the EOR. The group discussed adding a note to the plans that any modification would be "at the contractor's expense". However, the payment to the EOR by KYTC (thru a negative change order with the contractor) would still require a line item (similar to shop drawing review). It was suggested that such a line item (limiting amount) be added to the design estimate. Professional Services would need to approve.
- 13. DTI's use and need** – Although the "turn of the nut" method is typically used even after DTI's, DOC prefers to continue use of DTI's to assure due diligence on the contractor's part.
- 14. ORB lessons learned** – No one from DOC was directly familiar with ORB but stated that KTC would be providing an ORB lessons learned study in the near future.
- 15. Future or New Changes in Procedures** – None anticipated.
- 16. Future Meetings** – Continue annual combined meetings with DOC/DOSD/QAB as well as separate meetings with DOSD and the Division of Maintenance.