

## VRMCA/VDOT Joint Cooperative Technical Committee Meeting Agenda

July 28, 2015 - 10 AM to 12 PM

Virginia Center for Transportation Innovation & Research Auditorium/Charlottesville

Moderator – George Kuhn

### **I. Opening Remarks/Introductions**

George Kuhn welcomed all in attendance asking that each introduce themselves. The attendance list is attached to this document.

### **II. Read Antitrust Statement**

George Kuhn reviewed the Antitrust Statement that was placed on the projection screen.

### **III. Review/Approval of January 27, 2015 minutes**

George Kuhn stated that the minutes would be reviewed during the meeting before considering the ongoing agenda item. The minutes would be approved at the end of the meeting.

### **IV. Old Business**

#### **Ongoing**

#### **a) Drilled Shaft Special Provisions (SCC incorporated)**

George K - reviewed the previous meeting minutes for this agenda item. Allowing a larger topside coarse aggregate (up to one inch) for drilled shaft SCC would reduce the paste and lower the permeability. Last meeting Larry stated that he would pursue this change.

Larry - stated that he reviewed this topic with the Structures and Bridge Division and they want to keep the spec as written using No. 8 stone. One of the main concerns with drilled shafts is consolidation. When cross-sonic logging is performed on the finished drilled shaft, the expectation is to find no voids. Using SCC seems to have solved this problem.

Celik - We can get low perm results with smaller aggregates. However, the paste should be low. Bridge decks use a maximum of 600 lbs. of cementitious materials and a max w/c ratio of 0.45 and get good perm results. However, with some drilled shafts up to one inch max aggregate should be allowed.

Larry – Even if we allow up to an inch aggregate, there will be times when No. 8 stone is used, so changing this specification will not solve the entire problem.

Also, the Structure and Bridge Division asked who would be making the decision to allow a larger size aggregate?

George K. – can the perm spec be increased?

Michael Sprinkel – Increasing aggregate size would not solve the problem. The difference seen would not be noticeable given the variation in the permeability test procedure.

Celik – need to explain that up to a one inch aggregate is OK. With SCC there is less likely for water to be added. Permeability is controlled with mineral admixtures and lowering the water content.

Bobby Turner – On one job we were having problems meeting the permeability requirement for an SCC drilled shaft mix. However, once the mix was adjusted, the problem was solved.

George K. – The inspectors also need educating on making cylinders for SCC. There is a new ASTM for making SCC cylinders that should be used.

Larry – showed the new SCC spec that requires making SCC cylinders with the new test method ASTM C1758.

Celik - Do we need the J-ring in the field or just on the trial batch?

Patrick Sullivan (BASF) - If you get J-ring performance, you do not need non-J-ring performance. The J-ring is an important test.

Celik – then we will keep the spec as written with no changes to the J-ring test requirements.

#### **b) Contractor Quality Control on project**

This item discusses having the Contractor do all the Quality Control on design-bid-build projects. Larry Lundy has been trying to get a few minutes at the District Construction Engineers' meeting to discuss this topic. *This agenda item is ongoing and will be removed if the DCEs do not agree to move forward with this topic.*

#### **c) Shotcrete Specification**

There are significant differences in getting samples from a shotcrete panel and making samples out of the truck from a trial batch for testing.

(Brett Harris) W.R. Grace – getting a sample from a shotcrete panel and from the back of the truck is different.

George is concerned with the statement, “Any mixture other than approved mixtures shall have trial batch or historic data showing compliance with the specification.” If tested out of the back of the truck, we have no problem. We do not know how to test the trial batches on shotcrete to demonstrate compliance with the new specifications.

General comments from the group - There are many factors that may alter the shotcrete from when it is batched at the plant to the end product after pumping.

Several committee members agreed that the specs needed to specify that the Contractor is responsible for the quality after pumping due to the equipment, the nozzle men and the violent action of the pumping. Celik Ozyildirim explained that the sentence in the specification was added to ensure pre-packaged material was applied correctly. He suggested going to the pre-packaged industry and recommending deleting that sentence.

Bill – propose a change to the spec so that we can get it incorporated into the new spec.

George will submit a draft change to the shotcrete spec for review by the committee.

**d) Mass Concrete Special Provisions**

George – wants mass concrete specification to be performance-based.

Larry reviewed why the Mass Concrete Special Provision was being updated. Originally, the goal was to develop one special provision to work from. There have been a number of recommendations that if followed will result in significant scope creep.

Celik – stated that following the standard curing procedure would not work with mass concrete. We need to use temperature matched curing or the maturity meter.

Hari – how do you do a trial batch on a performance spec? This question needs to be addressed.

Larry will schedule a meeting with the subcommittee selected at the last meeting to develop a performance-based specification.

**e) Lightweight Concrete Special Provision**

George Kuhn pointed out that lightweight aggregate doesn't follow normal gradation. The specification currently references ASTM C33. Everyone agreed to change the specification to reference ASTM C330 instead.

Michael Robinson said that ASTM C330 should be specified rather than ASTM C33. Larry pointed out that the new spec for light-weight concrete in Section 217 required ASTM C330 gradation.

Also, note that the VDOT Road and Bridge Specifications, Section 206 specifies that the aggregate meet the requirements of AASHTO M195 which is based upon ASTM C330. Hence, no specification change is needed at this time. However, the goal is to incorporate the lightweight-concrete special provision into the spec book.

**f) Concrete Patching Special Provision**

George – will submit a change to allow temperature matched-curing along with the Maturity Test Method.

There was a discussion about concrete paving (not patching) not being able to meet the opening to traffic flexural strength in Section 316 of the VDOT R&B spec book.

Celik stated that VDOT needs to look into reducing the 600 psi flexural strength to a lower, more realistic number.

**g) Cold Weather Concreting**

George reviewed the previous meeting minutes stating that the VRMCA had no concerns with requiring a physical place for testing at 40 degrees F and greater during cold weather concreting. He felt that this was between the Contractor and VDOT, but appreciated the opportunity for review and comment.

Larry Lundy discussed the new spec requirements for the Contractor to provide a shelter for testing during cold weather. The VTCA did not have any concerns with the spec other than will the shelter have a separate bid item or be included in the cost of construction. Larry will get final approval from the VTCA before moving forward with this spec. *This item can be removed from the list*

**h) Update on VCTIR Study – Reducing Shrinkage Cracks in Concrete Bridge Decks**

Hari Nair discussed what VCTIR has found to be most effective for reducing shrinkage cracks. They have had most success with lightweight aggregate with 650 pounds of cement, as well as shrinkage reducing admixture with 600 pounds of cement. They have found Type K cement with 20% fly ash to also be effective. Currently, they are researching fibers with 600 pounds of cement which proves to be very promising. Hari Nair asked if pre-blended Type K cement could be used as opposed to components, and George Kuhn informed him that dumping bags would not be as user friendly as having separate silos. Larry Lundy mentioned that SRA and LW are in the new Spec Section 217, but only for bridge decks. He will check on if he can still change the spec for Hari to review. Rob Liberatore also suggested clarifying that the moving average of 3 sets of cylinders is during the field placement, not during the trial batch, and Larry agreed that clarification was needed. Bob Neal ask why change the permeability spec to 1500 Coulombs if it is not needed. Isn't the 2500 coulomb maximum for bridge decks sufficient? He was concerned that the producer would try to lower the permeability in a counterproductive way if it wasn't absolutely necessary; for example by adding silica fume which won't help with shrinkage. Michael Sprinkel suggested eliminating this wording about the 1500 coulomb permeability spec and referencing the permeability requirements in Table II-17 (2500 coulombs). *Hari and Celik will make this change in the spec, and Larry Lundy will review it.*

**i) Penalties for Permeability not paid for by the Cubic Yard**

Gail wrote up a new spec to address failing permeability results for concrete that is not paid for by the cubic yard. There were some instances where there were \$20,000 penalties for a couple thousand dollars' worth of concrete. George with get with the VRMCA technical committee and provide comments. *This item will remain on the agenda until completed.*

**k) SCC Special Provision for field use**

George reviewed the previous meeting minutes.

Larry stated that an SCC special provision has been used in several districts with success. This special provision was incorporated into the new spec book, Section 217.11. This spec was placed on the overhead screen and discussed.

*This item will be removed from the agenda with the publishing of the new spec book.*

**l) Allowing increased percentages of -200's in concrete – manufactured sand**

The VMRCA technical committee meeting will propose some operating rules on how this proposed study should be carried out and that everyone can buy into.

Celik – some manufactured sands are as good as natural sands and some are not as good.

We have only done field observations. Have not done a lot of lab work.

Bobby – NoVA has been used blended sands (30% and 15% out of two different plants).

Mixes look beautiful. Contractors complain a little bit about the harshness. Products that require hand finishing scales, but the slip-forming does not scale.

Celik – small percentage additions do not seem to be a problem.

Bobby – areas where the Bidwell is not finishing, minor scaling on the bridge deck is with the hand work. I tend to think the hand work and the addition of water is creating the scaling. This is with both natural sand and blended sands. Producer has blended the two products to meet the Grading A specification. This is where the blending numbers come from. We do not have any 100% manufactured sand used on VDOT projects. However, private jobs use it routinely.

George – we use 100% limestone manufactured aggregate all the time, but not in bridge decks. Industry wants to look at the whole pilot program and develop some operating instructions about how to proceed. There seems to be some confusion about how to handle the blending. George does not see anything in writing that there needs to be pre-blending.

Bobby – How do we ensure that we get spec sand without blending? I have had many producers blend sand in the truck. However, how can we pull samples if we do not have a certified product? We could have manufactured sand to have its own specification.

George – under the performance based mix design, you could use 4 aggregates and it would be approved.

Celik – how do you control the gradation throughout the job?

George – how do we control it today? Under a two aggregate mixtures you can look at the batch tickets and see if we followed the mix design. What difference does it make if we blend in the truck or do pre-blending?

Michael Robinson – would lose control if trying to preblend

George – is there a spec that requires pre-blending? Do we need to create a pre-blended material?

Patrick Sullivan – the more rules, the harder it is going to be. The more freedom, we can do more to improve the final product.

Celik – once we have decided what is needed in the trial batch, does that mean we do not need to do any evaluation during production? I don't think so.

George – if you want to test an aggregate A, VDOT can do this. However, we do not want to create a third material pre-blended.

*George and Larry will get together to review topic in conjunction with the new MOI, Chapter IV and the operating plan that will be developed by the VRMCA Technical committee.*

#### **m) VDOT Verification of Retarder Set Times**

George stated that project personnel are still allowing the contractor to place concrete continuously instead of following the designer's placement sequence. How do you verify the concrete stays plastic during the entire concrete placement? After meeting with the bridge designers, they agreed that changing the concrete placement sequence should not be done.

Celik – we should not allow continuous deck placements.

Hari – With a continuous concrete placement we had a lot of cracks on Rte. 633.

Larry – Even if the concrete is tested, the original placement involved vibrating the concrete around the steel. When the concrete is placed on the deck, the steel will deflect. Even if the concrete remains in a so-called plastic state and tested to a value demonstrating plasticity, we will still voids around.

Celik – how do you test for plasticity?

George – There is no spec that covers how to test for plastic concrete.

Celik – We need to go to the beginning of the bridge, dig out the concrete and perform the penetrometer test. However, often one batch does not match the setting of other batches.

Patrick Sullivan – Testing in this fashion does not solve the problem that Larry brought up. This problem is real.

Bill Bailey – Feels the DME's and DBE's are on same page with not allowing continuous concrete placements.

George – when we put mix together we need the specs to ensure that our mix is going to do what we say it is going to do. What is the definition of plastic and how do we measure it?

*This item will be kept on the agenda – until resolved.*

#### **n) Anti-washout Agents for Underwater Concreting**

Pervious and roller-compacted concretes use VMA's. Celik wants to work with the admixture industry to investigate these. Anti-washout agents can be tested according to the Army Corp of Engineers test method. What needs to be determined is the mass loss spec.

WR Grace – some VMA's are good for anti-washout and some are not.

Patrick – certify VMA's as TYPE S. Some VMA's are anti-washout admixtures. You want the anti-washout testing. We will sell the anti-washout as a VMA and a VMA as an anti-washout agent.

WR Grace (younger) VMA may not need to meet an anti-washout admixture.

Celik – Should anti-washout admixtures be tested?

Some VMAs are also anti-washout agents. However, some VMAs are not anti-washout agents. Furthermore, some anti-washout are not VMAs. VMAs with anti-washout test must be requested. These admixtures should have to meet Type S requirements.

*This item will be kept on the agenda until resolved.*

**o) Mistert in front of the Screed**

Section 404.04 of the spec book has been updated not allowing mistert in front of screed. Larry placed the draft spec book that is out for review on the screen for review. *This agenda item is complete and will be taken off the agenda.*

**p) Additions/VDOT Testing on the jobsite**

George stated that the VRMCA is OK with allowing the producer and contractor to get the truck ready for testing before submitting the truck to VDOT for testing. However, the VRMCA wants to review the draft MOI language before this is finalized.

*Larry will provide the draft MOI Chapter IV to the VRMCA after the DME's have reviewed the document.*

**Completed**

- q) End Result Pay Factors – dead issue
- r) 72 Hour Curing in the field
- s) Higher class provided than that specified, what specification should apply
- t) Plant and Truck Inspections Certification

**V. Fly ash Update – shortage of fly ash – use non-flyash mixtures for certain structures?**

Tom (SEFA) – there is a shortage. Flyash comes from coal use. There has been a huge reduction in the amount of coal burned. It is not going to get any better. Power plants are going from coal-burning to natural gas. There is only one coal-burning power plant left in the state. The rest have been decommissioned. Dominion has developed natural gas sources. Large manufacturers have converted their onsite power plants (for their own use) to natural gas. It may take a generation to change. Regionally, there is a flyash shortage due to less coal being burned. We need backup plans due to the flyash shortage. There will be a need for some quick mix design changes when there is a shortage. VDOT needs to waive the 28 day strengths and reduce this to 7 days. Slag may be more readily available. Only 120 grade slag is coming out of Baltimore. Boston imports slag from Europe.

Bob Neal – on entire east coast slag is imported.

Tom – there is plenty of silica fume, but it is a niche market.

George – can anything be done on a materials side? I do not think you want to have contractors use silica fume all over the state. Can we look at structures and reduce the

pozzolan level that would not meet the ASR requirement? What if 15% addresses the permeability, do we still need to meet the ASR requirement?

Celik – use ternary mixes.

Tom – producers will need an additional silo.

Celik – silica fume can be added in bags.

George – We can't put K-component in bags, but we can add silica fume?

Michael Robinson – except the bags do not dissolve.

Celik – We have a report using ternary mixes. This is the way to go. This is the way they make specialized concrete.

Tom voiced concerns with 3 component systems because there would be a cost associated with that, like the cost to get another silo. Lithium was mentioned as an option, but Celik said it was too expensive.

George Kuhn wants to look at a combination performance approach like using aggregate known to avoid ASR issues or adding another component to reduce the percentage of fly ash.

## VI. New Business

### a) **Option Based Mix Design Trial Batching – VRMCA recommendation – closed issue –**

*VRMCA OK with 48 hour notice*

### b) **TL 27/TL 28 Forms**

George stated that we need a committee with VRMCA and VDOT volunteers to answer the question, “what is the functionality we need to maintain?” with the forms. TL-27 and TL 28 forms need to be updated with the new spec changes. *George and Larry will get VDOT and VRMCA people to draft up new forms.*

### c) **Point of Sampling of Concrete**

George stated that if concrete is pumped, there is no way to give VDOT a mix that gives you what you want on the structure. It is OK to do additional testing. However, for a producer, VDOT has to test at back of the truck. The language is not as clear as it needs to be in the spec.

Bob stated that we should add a section above Section 217.08(a) that says “For the purpose of acceptance testing for consistency, air content, and preparation of strength, hydraulic cement concrete shall be sampled from the mixing/delivery unit in accordance with ASTM C172, except that the sample shall be taken after the discharge of a minimum of two cubic feet of concrete. Additional, (but not alternate) points of sampling may be dictated by the Engineer when deemed necessary.” Then delete out conflicting parts of Section 217.08 (a) and (b)



## **VII. Concluding Remarks**

With no comments on the January 27, 2015 meeting minutes, the minutes were approved. George thanked all for their attendance. The next meeting will be at the VCTIR (Virginia Center for Transportation Innovation and Research) auditorium on January 26, 2015 at 10 AM. The meeting was adjourned.

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