TPF-5(368) PERFORMANCE ENGINEERED CONCRETE PAVING MIXTURES (PEM)
SOUTH-CENTRAL REGION STATE-INDUSTRY PEM CALL

December 17, 2020
Meeting Minutes

Attendees:

Name	Organization	Name	Organization
Gordon Smith	CP Tech Center	Angela Falkstad	CO/WY ACPA
Peter Taylor	CP Tech Center	Sarah Sanders	CO/WY ACPA
Jerod Gross	Snyder & Associates, Inc.	Todd LaTorella	MO/KS ACPA
Mike Praul	FHWA	Jason Weiss	Oregon State University
Bob Conway	FHWA	Tyler Ley	Oklahoma State University
Eric Prieve	Colorado DOT	Cecil Jones	Diversified Engr Services
Dan Wadley	Kansas DOT		
Dave Meggers	Kansas DOT		
Matt Romero	Oklahoma DOT		
Daryl Johnson	Oklahoma DOT		

Discussion items:

1. **Has your state agency recently implemented any new tests to your concrete program or are you planning to implement any in the near future?**

Colorado: Revised spec in October 2019. Colorado specifies Box and also RCPT/resistivity testing in their spec. Looking at SAM for mix design. Contractors are using optimized gradation and some of the current testing. Contractors are familiar with PEM. Consultants testing for the contractors and going good. More of an adjustment to the ready mix suppliers. Require 20% SCM (F ash) if contractor wanted to use Class C, then oxychloride test.

Kansas: SAM, Formation Factor, Box test and VKelly (and hybrid) on research side, looking at the Phoenix. Looking at putting SAM in the mix design as well as QC/QA possibly in the 2021 spec. Permeability testing in spec now – concern for SCMs. KDOT has standard Certified Inspector Training course for new inspectors. KDOT is implementing the SAM training annually taught by DKOT engineers with assistance from OSU with it being a part of CIT in the future.

Oklahoma: Doing Optimized gradation mixed designs for a while with success. Looking into other testing but have not implemented any yet. Buying three Phoenix to use in the urban areas (Oklahoma City/Tulsa area) & District 5. District 5 looking to use SAM, collecting data, wait and see approach. Tyler stated as more testing and data comes in it will help with understanding.

2. **Do you currently leverage QC in your specification? In other words, do you require QC and does the state do any monitoring of QC? This question is NOT asking if you use contractor data for acceptance.**

Colorado: They do require QC testing plan submittal from the contractors. They leverage gradation for optimized mixes with penalties. Multiple failures shuts down project.

Kansas: Collect QC data, they do their own Q/A data including PWL, thickness cores at the end of the project. Check QA for pay items, gives contractor motivation for performance. QC and QA for paving have not implemented for structures. QC and QA for most projects but not for smaller projects. Contractors familiar with process since been required since the 90's, focusing on durability pay factors, dropped emphasis on strength, looking at smoothness. Looking at five pay factor items.

Oklahoma: Require contractors to have a QC plan but they are not enforcing them. There are some contractors that would like to see how it goes with the data they collect from the test methods.

3. **Have you engaged your agency construction staff in a PEM discussion/planning? If so, what are the details?**

Colorado: Staff have discuss with spec committee, PEM is mostly with mix design phase.

Kansas: They do on several occasions. Address with each piece they move forward with they share internally and externally.

Oklahoma: Discussions weekly with construction staff, looking at implementing SAM in mix design, discuss training with Highway Materials Certification process. Meet with District engineers once per month with a lot of PEM discussion, what is coming in the future. Share what other states are doing to keep them up to date. Released 2019 spec book. They do not require air test at the end of the pump anymore; test before the pump.

4. **Have you made, or will you be making, spec changes to transition from prescriptive requirements to a performance approach? Some examples of this are:**
   a. **Eliminating slump testing for acceptance**
   b. **Eliminating minimum cementitious content requirements**
   c. **Eliminating single aggregate gradation requirements**

Colorado: Oct spec has PEM incorporated. Slump test within 2" of trial mix for consistency (not acceptance), they do not have max and min cement requirements, allow optimized gradation.

Kansas: They don't have single aggregate gradation. Require slump as indicator for how mix is doing in the field – for consistency.

Oklahoma: Interested in removing slump test for acceptance. Discussing application for the test. Status quo for cementitious content, require a modified tarantula curve.

5. **Which statements describe your agency's approach to PEM:**
   a. **We are satisfied with the status quo and do not envision making significant changes.**
   b. **We will be keeping our program as is but planning to add a new test or two.**
   c. **We are enhancing our spec approach and adding QC requirements.**
   d. **We plan to develop robust QC requirements and include some level of agency monitoring of QC.**

e. **We will be reducing/eliminating prescriptive requirements and moving to a performance approach.**

Colorado: a, since just implemented a new spec with PEM

Kansas: b, because KDOT has a lot of PEM in place already. Looking to "add the cream"

Oklahoma: b

6. **The current PEM initiative focuses heavily on the mix and mix design ("design the mix properly for its service environment"). Moving forward, do you see the next step towards performance specifications as an effort to develop ways to assess the impact of construction activities? (the ultimate goal is being able to test the concrete to be sure we "build the concrete to perform in its service environment.") Some examples include effect or pumping/transport, vibration, and real-time curing assessment.**

Colorado: In place concrete gauge, look at lowering opening strengths to speed up construction and repairs. IRI results differ after initial testing; look at slab sizes? Stiff base can be a concern; Colorado is a dry state and can affect shrinkage/curling warping. Industry sees this as well. IRI variability hours later. Looking at options to help

Kansas: all mentioned above, admixtures, curing. For both structures and paving PEM used as trial on a project. Concern with having enough experience people to conduct and manage testing (agency and industry) Training!

Oklahoma: Need to improve curing practices, working with Tyler.

Additional question: Does your state plan to complete more shadow testing on upcoming projects?

Colorado – would need to add to the spec for additional testing if asking contractor, consider a pay item, state hesitant to add people to the project, industry desires additional testing (shadow) to collect data. In Michigan and Wisconsin, they hired a third party to conduct testing. DOT asked to be more efficient, struggling with adding to projects.

Kansas: Nothing is coming this year on paving for shadow testing. Todd: (industry would like to see shadow testing prior to full implementation, especially when it comes to new pay factors, but they are fully supportive of this and will be involved. I don't think we have enough experienced private consultants to do, hard in rural states with long travel distance. I think industry-agency coordinated is probably our best option.

Oklahoma: Looking at Phoenix test, SAM meter shadow testing, budgets may be impacted on upcoming projects. Districts are exited in shadow testing (do not need third party).

Homework questions:

What can the PEM Team do to assist you today in accomplishing your PEM vision?

Kansas interested in QC guide.

Chat window comments:

[12:07 PM] Matt Romero (Guest)
Thank you, cannot believe we allow what we do.

[12:08 PM] Todd LaTorella (Guest)
We (industry) would like to see more shadow testing prior to full implementation, especially when it comes to new pay factors, but we are fully supportive of this and will be involved

[12:13 PM] Todd LaTorella (Guest)
I don't think we have enough experienced private consultants to do, hard in rural states with long travel distances. I think industry-agency coordinated is probably are best option

[12:14 PM] Folkestad, Angela
Completely agree with Todd's comments

[12:16 PM] Tyler (Guest)
Todd - Maybe we could do a training in the Kansas City area and get you some testers. If you had a test in that region then that would be helpful.

[12:17 PM] Todd LaTorella (Guest)
We could, consultants are telling me they're maxed out with their staffs, we can always use more training especially with all the turnover

[12:20 PM] Tyler (Guest)
Let us know if we can help when the time is right.

[12:20 PM] Todd LaTorella (Guest)
Great discussion, much appreciated