

**TPF-5(368) PERFORMANCE ENGINEERED CONCRETE PAVING MIXTURES (PEM)
NORTH-EAST REGION STATE-INDUSTRY PEM CALL**

October 21, 2020
Meeting Minutes

Attendees:

Name	Organization	Name	Organization
Gordon Smith	CP Tech Center	John Becker	Pennsylvania Chapter ACPA
Jerod Gross	Snyder & Associates, Inc.	John Staton	Michigan DOT
Mike Praul	FHWA	Dan DeGraaf	Michigan Concrete Assn.
Bob Conway	FHWA	Pat Galarza	New York DOT
Tom Van Dam	NCE	Adam Miller	New York DOT
Tyler Ley	Oklahoma State University	Jonathan Kunin	New York DOT
Cecil Jones	Diversified Engr Services	Bill Cuerdon	New York Chapter ACPA
Rich Bradbury	Maine DOT	Patricia Baer	Pennsylvania DOT
Dan Miller	Ohio DOT	Rich Jucha	Pennsylvania Chapter ACPA

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?**

Maine:

Implemented shrinkage testing to build a baseline. They have bridge deck cracking and looking to reduce cementitious content. Air content and surface resistivity are also tested.

Michigan:

Focusing on Super Air Meter (SAM) collecting and analyzing data. Have asked University of Michigan to do hardened air void analysis of about 75 cylinders that coordinate with SAM results. Been doing optimized gradation, reduced cement content for about 15 years. Need to centralize the training so everyone is running the tests the same way. Need to watch what data is used for acceptance. Tyler stated a new gauge has been developed that will not give a number if the testing is run incorrectly.

New York:

Tested SAM, resistivity and paste. On paving they have done PEM with mixes from ready mix plants. Have not done contractor plants. Required SR testing and attention to aggregate testing. They will look at Box test or V-Kelly.

Ohio:

No new tests. They are using the SAM. Majority of their projects are small ramps. Would like to look at Box test. They allow the tarantula curve. Big concern with contractor is staying on the low end of cementitious. Bridge deck cracking is a big concern in their area. Doing good with QA testing, however private testing labs are estimating some of the testing.

Pennsylvania

Working on structural concrete and pavement concrete specs. Focusing on reducing the cement content. They are doing resistivity testing and shrinking testing. They have a good QC spec. Trying to

get more SAM meters and planning to implement the SAM to get more people using them. Contractors are using the Box test. They also have a special provision for internal curing.

Discussion: What can the team do to help move resistivity & formation factor forward?

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.

Maine:

Have QA on projects for process control and for quality on the plant. We also use quality control on the job site. They review the QC plan on all projects. If not followed, it can lead to financial penalties.

Michigan:

Have QC/QA specification. QC plan is in the contract requirements. Would like to see emphasis on execution of the quality items throughout the process of construction on the project. It's a process of the state approving it correctly and the contractor writing it correctly. People are getting the QC plan but still see some gaps. They need to read the QC plan to eliminate a lot of problems down the road. Need to include the FHWA representative in the projects to make sure they are following the requirements.

New York:

Modify the QC/QA specifically for PEM. Trying to use control charts during placements. Trying to get the producers and contractors familiar with submitting the control charts and our inspectors familiar with reviewing them. Need to step-up on the training. On pavement operations, we do not have any penalties. Contractors will resist if you do not have penalties. The structural concrete QC is new to them. On structural concrete we are just starting to use QC, it is a learning curve. Need to tie in payment to get quality control.

Bill Cuerton asked if the states and FHWA could share their control charts. Jerod can share Maine and Michigan specs.

Rich Bradbury – Implementation is critical on the QC plans. Make sure everyone understands the plans.

Mike Praul – Michigan and Maine were models for the new QC specifications. FHWA is working on control charts in the new FHWA specification. Including control charts on unit weight and air together as they should track each other. Should be out within the next several months. This is a concrete document not an agency document.

Ohio:

We have QC but some plans are lacking and some plans are better. Ready mix provides the information. The majority of the QC plans are written by the Contractor's QC lab. It seems to work fine. It is now in our specification. Still a learning curve for some.

Pennsylvania

They have minimum QC plans for plants and out in the field for paving. They review them and sign off on them. Look at the QC testing that is done at the preconstruction meetings. Very detailed for structures.

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

Maine:

Do not have regular meetings with their concrete industry but they do have meetings with the aggregate association. Some ready mix producers are included in the meetings. They are talking about implementation of a composite gradation for improved workability and reduced cementitious. Focused on aggregate to alter some of the gradations.

Michigan:

Each region is different. The metro areas have good QA/QC representation. Remote regions may not be using the QC plans as they should. Focused on getting the concrete mixes approved as opposed to reviewed. Need more engagement taking it to the field.

New York:

Engaged with construction in the field. Work with the design-build groups to include the QC. Need to do more interaction with the construction group and inspection agencies. It's the materials group that needs to get on board.

Mike Praul – FHWA is offering virtual testing training with the mobile lab.

Ohio:

Each district has their own test lab. Construction staffing is low and changes a lot. They hire private testing labs and they don't take as much ownership of the testing.

Pennsylvania

They have quality improvement committees. DOT and industry, Construction, materials, design and maintenance on the committee. They provide conferences for training.

Jerod: - stated it has been mentioned by other states that it is important to get private consultant testing agencies more education.

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**

Maine:

a. they are doing. b. in talks to do, c. actively implementing.

Michigan:

a. not high on their priority due to hand placement mixes. b. have not limited it. Could be troublesome with contractors, but have reduced cementitious. They have a max cementitious. c. Have been working on this for several years. Worked with aggregate producers and tweaked the spec accordingly for bridge deck applications.

New York:

a. yes on the pavement side. b. Cutting back on cementitious content. c. would like to get to this but concern with material availability. DOT said 25% max paste, max .40 w/c. Structural side 25% paste is not workable. Going with 27% since it is an improvement.

Ohio:

a. when ACI gets rid of it as a field test certification. b. are looking at going lower, minimum is 520 pcy. c. already well graded.

Pennsylvania

a. no slump testing for acceptance, do for QC tied to admixture. b. lowered the minimum and maximum on paving and structural. c. All paving requires optimized gradation, looking at doing some for bridges.

The following questions were answered in the chat box after the meeting.**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.

Maine:

Ideally, we're moving to e. Post-construction quality measures will be critical.

Michigan:

We have moved our QC/QA special provision requirements to the 2020 Standard Specifications. Hence, we will be keeping the contract requirements for PC, but can see that outreach and more emphasis on the details and enforcement/training/enhancements is critical. It makes no sense to add additional requirements if the current requirements are not being taken seriously.

QC needs to be carried forward to construction practices and tied more closely to payment...in particular, the contractor's ability to engage in any dispute resolution process. It makes no sense to be lax on enforcing/administering QC oversight and then turn around and permit the contractor to dispute the agency's acceptance test results.

New York:

Our goal is to move toward a performance based approach.

Pennsylvania: I would like to see us going to a performance based approach.

Discussion: it will be important to engage testing consultants so they are up to speed on PEM to help contractors that may not have the resources for self-testing.

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.

Maine: Yes, absolutely. Post-construction quality measures will be critical.

Pennsylvania: I would love to see this move to including construction activities.

New York: would like to move towards performance based.

Homework questions:

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

What do you think of this format?