

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

September 15, 2020
11:00AM Central Time
Meeting Minutes

Attendees:

Jason	Reaves	ACPA – South Dakota
Kevin	McMullen	Wisconsin Concrete Pavement Association
Michael	Praul	FHWA
Robert	Conway	FHWA
Todd	Hanson	Iowa DOT
Darin	Hodges	South Dakota DOT
Matt	Zeller	Concrete Paving Assoc. of Minnesota
Maria	Masten	Minnesota DOT
James	Parry	Wisconsin DOT

Team Members

Peter	Taylor	National CP Tech Center
Gordon	Smith	National CP Tech Center
Jerod	Gross	Snyder & Associates
Jason	Weiss	Oregon State University
Tyler	Ley	Oklahoma State University
Cecil	Jones	Diversified Engineering Services

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?

Minnesota: using Phoenix, look at data in fall, looking at incentives, will be gathering data from 2nd FHWA incentives project, SAM more of an agency tool. Resistivity testing continues. Bucket testing with their mixes. Don't see a lot of changes.

Wisconsin: Optional PEM, Box, optimized gradation, reduced cementitious in mix design phase, SAM shadow testing, flexural rather than compressive, looking at implementing SAM for acceptance, looking at resistivity. Working on FHWA incentive project. In 3rd year of SAM data collection. Industry stressing to contractors to look at SAM to get where they want to be. Fly ash availability concern. Need to put emphasis on resistivity and form factor.

Iowa: Using SAM, Box, Resistivity on shadow projects. PEM mixes are able to lower cement content, appears to get good smoothness, incorporate into QMC spec (Cedar Valley Corp is on board), seeing good results.

South Dakota: SAM & Box used on mix design with shadow project, tarantula curve, considering adding these items on mix design phase to specs. Sioux Falls project currently including resistivity testing (ready mix source).

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

Confirm the resistivity / formation factor procedure and specification. Team recommends AASHTO TP119 with sample conditioning method A. The information is on the PEM Website, team will send link and information to states/industry.

Confirm the units and calculation process.

What are the thresholds/ target values?

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.

Minnesota: yes, leverage QC testing by contractor. (They do use contractor data for acceptance).

Wisconsin: yes, for both. For every 5 tests by contractor, agency does 1.

Iowa: yes QC testing on QMC projects (>50,000 sy). Contractor does QC, agency does QA. Data submitted on spreadsheet.

South Dakota: Do not currently include QC in spec.

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

Minnesota: No, but exposing to different tests at this point. Concentrate on industry now.

Wisconsin: Yes, exposure to new tests (SAM) but no formal training.

Iowa: No, except for the few shadow projects. Exposure through QC testing.

South Dakota: Have presented PEM to const. staff, but no formal discussion on implementation.

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

Minnesota: talked about basing incentives on total cementitious content. Remove slump testing except bridge design.

Wisconsin: yes or in process. Reduced min. cementitious, and other.

Iowa: Reduced cement content and validate, uses shilstone gradation, contractor prefers listing a min. cement content.

South Dakota: not immediate, but considering slump for consistency, maybe not lower min. cement content, validate mix design in field.

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.

Minnesota: Maybe between B & E. specs geared to mitigate ASR and monitor w/c. with fly ash issue, look at everything. Use PEM tools as a benchmark.

Wisconsin: Use multiple PEM tests. E. some contractors will embrace, some will need help.

Iowa: B & E. use QC data if issue.

South Dakota: More B, little bit of C. Tweaking current approach with new tests. Testing by consultants due to small size of contractors.

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.

Minnesota: yes, it is a package and partnership. Stress the basics. Look into how to overcome failures, because they will occur.

Wisconsin: yes, take to construction environment. Include all parameters with const. activities.

Iowa: Const. staff has checklist. Consider app with agency review.

South Dakota: Yes. Carry into the field and verify we are getting the product. Educate our contractors.

Homework questions:

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

What do you think of this format?