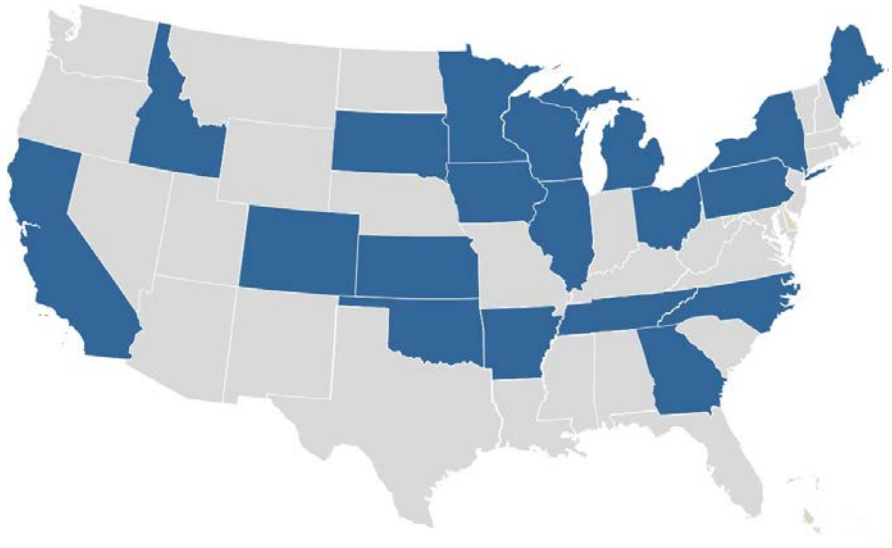


Performance Engineered Mixtures (PEM)
Delivering Concrete to Survive the Environment
July, 2020

PEM Headlines

In late 2019, Maine joined the [Performance Engineered Mixtures \(PEM\)](#) Pooled Fund. There are now 19 states committed to the development and implementation of PEM.



19 States + FHWA
& Industry

2019 PEM TAC Meeting

An annual PEM TAC meeting was held on November 18 & 19 in Minneapolis. Members of FHWA, State DOTs, Concrete Associations and research team attended the meeting to discuss the progress and future plan of the project. Listed below are the summary points of the meeting:

- Training is critical, but it is not cost effective or practical on a one-one basis. Train the trainer is an option. Need to look at other possible methods including videos, web-based system or regional training sessions.
- Project data needs to be reviewed by the PEM Team. Any PEM data should be sent to the CP Tech Center. CP Tech Center will put together an inventory of data, gather the data and forward to NCE (Tom Van Dam) for uploading into the project database.
- Dispute resolution needs to be part of discussion when establishing the specification. This includes guidelines for good, bad, and borderline results.
- States are at different stages and those that are further along need to tell their story. The lead states should share their process to help other states develop an implementation plan. This could be a simple one page resource of steps to take.
- A robust QC program is necessary.
- The concrete industry is on an evolutionary journey and needs to commit for the long haul – it will be worth it!
- Complete notes from the November 18-19, 2019 TAC meeting are posted on the PEM website [here](#).

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2020 PEM State Agency TAC Call

A web-based meeting was held on June 11, 2020 with the state agency members. Notes and slides from the call are posted to the PEM website [here](#). A similar update call with industry members is being planned for July.

Upcoming Shadow Projects & MCTC

The FHWA trailer ([MCTC](#)) cannot commit to any in person contact this year. A new product the MCTC is focusing on is training and conducting technician-level webinars for individual states. From among the list of all tests available on the MCTC, states can choose which to have explained and demonstrated to their staff. FHWA envisions 1-hour webinars. States may request multiple webinars, and these will be available upon request. Please contact [Mike Praul](#) if you are interested in a webinar for your state.

State DOTs are encouraged to share their schedule of planned shadow projects with [Gordon Smith](#) or [Jerod Gross](#).

Data

Shadow projects are the reason we collect data. States are doing their normal testing; the PEM research team is shadowing what the states are doing and collecting data for some of the tests to see what would be useful.

Shadow testing data has been received from 4 states and under review by the research team. The data entry form is on the PEM website and is available for [download](#). Sampling should have identifiers such as batch number and station location. The research team is looking to modify the data entry spreadsheet to include latitude and longitude coordinates as well as incorporating the SAM algorithm.

A data spreadsheet is under development by the research team that allows for viewing of all data received. The file includes filter options for fresh and hard properties for state, route, test type/property, sample location, test result and others. States are encouraged to provide input regarding what specific data they are interested in. Please contact [Gordon Smith](#) or [Jerod Gross](#) regarding data.

PP84 Update

The comment period for the 2020 AASHTO ballot has recently closed. Most of the PEM standards are now fairly stable and we are considering moving them towards full standards. Any negatives and comments will be addressed at the virtual COMP meeting in July and August. After the meeting, Brian Egan plans to step down as chair as he is taking another position with TDOT. It is assumed the current vice chair will take over. It is anticipated that another task group will be appointed to address the AASHTO T358 test. The research team will continue exploring options with the new committee chair about the development of a standard device that

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can be used to verify the various instruments currently in use for measuring resistivity. Oregon State University has started a prototype on this device outside of the PEM contract. Technology subcommittee has the ballot out for 8 provisions, 4 of them regarding the PEM process. Contact [Cecil Jones](#) with questions on PP84.

Training

Training has been provided in 12 of the 19 pooled fund states. The research team will reach out to states that have not received training to discuss their interest.

Shadow Test Field Reports

Minnesota and North Carolina have completed their final reports of their shadow projects conducted in 2019. FHWA incentives were utilized for the projects. The reports are available on the PEM website using the following links:

[Minnesota report](#)

[North Carolina report:](#)

Request for Samples and Data

A reminder to send samples and test data to [Jason Weiss](#) to determine specification parameters and to calibrate mixtures and tools being developed for Performance Engineered Mixtures.

- 16 oz. containers of binder materials (cement, supplementary cementitious materials)
One 16 oz. sample of each binder is adequate
- 10-12 4x8 cylinders for each mixture. **The cylinders can remain in the molds and sealed for shipping after 1 day of hardening. Label and date all samples.**
- Data from fresh property measurements using either
 - AASHTO TP-118 Standard Method of Test for Characterization of the Air-Void System of Freshly Mixed Concrete by the Sequential Pressure Method
 - AASHTO T-152 Standard Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method
- Data from strength measurements performed
 - Compressive Strength if available
 - Flexural Strength if available

Please contact Jason with any questions.

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Remember to Check Out the PEM Website

The format of the [PEM website](#) has been updated but the general information has not changed. There are a few new items:

- [Resistivity- Conditioning and Summary one pager](#) – Simplified description of the sample preparation and links to information about the test.
- [PEM Specification Review Table](#) – This includes 19 state specification summaries for PEM properties, recommendations and summary of changes to the specifications based on state calls and TAC meetings.

Contact

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For more information, please visit <http://www.cptechcenter.org/pem/>