

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): IOWA DOT

INSTRUCTIONS:

Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.

Transportation Pooled Fund Program Project # TPF-5(368)	Transportation Pooled Fund Program - Report Period: Quarter 1 (January 1 – March 31, 2020) X Quarter 2 (April 1 – June 30, 2020) Quarter 3 (July 1 – September 30, 2020) Quarter 4 (October 1 – December 31, 2020)	
Project Title: Performance Engineered Concrete Paving Mixtures		
Project Manager: Todd Hanson	Phone: 239-1471	E-mail: todd.hanson@dot.iowa.gov
Project Investigator: Peter Taylor	Phone: 515-294-9333	E-mail: ptaylor@iastate.edu
Lead Agency Project ID:	Other Project ID (i.e., contract #): Addendum 629	Project Start Date: 10/1/17
Original Project End Date:	Current Project End Date: 12/31/2021	Number of Extensions: PFS

Project schedule status:

On schedule On revised schedule Ahead of schedule Behind schedule

Overall Project Statistics:

Total Project Budget	Total Cost to Date for Project	Total Percentage of Work Completed
\$1,913,860	\$1,563,342	NA

Quarterly Project Statistics:

Total Project Expenses This Quarter	Total Amount of Funds Expended This Quarter	Percentage of Work Completed This Quarter
\$110,173		

Project Description:

Concrete for pavements has historically been specified and field controlled around acceptance criteria that do not relate well to durability (slump, air content, strength). Paving concrete specifications need to be built upon engineering properties that directly relate to good field performance. With the recent advancements in research knowledge on failure mechanisms, and the parallel development of better tests, this is possible.

A review of many current and new specifications has found that they are still largely based on strength, slump, and air, which provide limited correlation with the mechanisms of pavement failure currently observed. The need for change in the way we specify concrete, especially concrete for paving mixtures, is becoming increasingly apparent as mixtures become more complex through a growing use of a range of chemical admixtures and supplementary cementitious materials. Traffic loadings continue to increase, more aggressive winter maintenance practices are implemented, and demand increases to build systems more quickly, cheaply, but with intent for increased longevity.

Tasks include:

- Task 1: Implementing What We Know
- Task 2: Performance Monitoring and Specification Refinement
- Task 3: Measuring and Relating Early Age Concrete Properties to Performance

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

For Quarter ending June 30

- PEM research/implementation team conversations have been held throughout the quarter.
- SHA specification reviews have been completed with all of the TPF member agencies. following: The information collected during these interviews reveals the status of PEM implementation for each state. SHA progress was reviewed at the TAC meeting in November and discussion followed about the need to continue to encourage shadow testing, data collection and analysis, a construction specification incorporating PEM language, pilot projects and state/industry implementation. A summary of findings from the reviews is found at the following link: https://intrans.iastate.edu/app/uploads/sites/7/2020/07/PEM-State-Spec_Reviews-Table-2020-07-02.pdf
- The PEM Team is collaborating with FHWA's Mobile Concrete Technology Center (MCTC), Lisa McDaniel of the IA Division FHWA, SHAs and industry to collect and analyze PEM test data from around the country. As we gather and review the data, the results will be shared with the PEM TAC.
- While we had hoped to coordinate with FHWA's MCTC to schedule 2020 state visits with industry- supported PEM open houses, the restrictions on travel due to COVID-19 has cause a cancellation of all 2020 events. FHWA and the CP Tech Center have found this partnership for communicating the PEM message quite effective. As in the past, PEM Team members were on call to respond to inquiries from SHAs and contractors/producers seeking guidance about testing and response to field issues. This includes PEM pooled fund member SHAs. We have also responded to several non-pooled fund member SHAs in our effort to attract additional states to the pooled fund or at least interest them in the PEM initiative.
- Members of the PEM Team continue conversations with SHA TAC members and industry to identify and arrange training for PEM tests. Our intent is to assure that all SHAs are afforded one opportunity for local training. Obviously, the COVID-19 pandemic is impacting training programs, too. Currently, training has been provided for 12 of the 19 pooled fund member SHAs. FHWA is exploring virtual training opportunities.

- With the leadership and dedication of Cecil Jones, we have begun reviewing the 2021 edition of the PP-84 Standard Practice for Developing Performance Engineered Concrete Pavement Mixtures. The revisions will be submitted to AASHTO for consideration and comment this spring. A technical subcommittee ballot is anticipated in early May. There may be some additional standards brought forward as a supplement to PP84.
- PEM Team members Gordon Smith, Peter Taylor and Jason Weiss have visited with FHWA recently as they explore collaborative efforts in moving forward with their programs that could further the standardization of the PEM tests relating to permeability.
- LTPP data and cementitious materials suspected for MRD are being analyzed (NCE and Oregon State University).
- PEM/SHA TAC members joined for a virtual meeting on June 11, 2020. The agenda included reports on PEM progress, data collection and analysis, the NC PEM implementation strategy, training and Team member reports

Anticipated work next quarter:

- The PEM Team will continue to review and program the needs and objectives for the remaining two years of the PEM pooled fund project per discussion at the November TAC meeting.
- Collect, review and process shadow test data using the PEM data entry spreadsheet. Synthesize the information and make it readily available to all TAC members and interested parties.
- Cooperate with the TAC through regional virtual discussions to identify and define current and future needs for training of SHA, private engineering and industry audiences. Then we will work to develop and propose a PEM training program for future advancement of state/industry preparedness.
- The Team will work toward completion of first round training proposed for each member state, when possible due to the COVID-19 limitations.
- Schedule and present the one-day engineering level PEM workshop to interested agencies and industry. The intended audience is the group of central office and district SHA materials and construction engineers who will be directly responsible for guiding the PEM implementation in their state. We will also explore the concept of offering the webinar in a multi-day format.
- Provide general outreach and assistance to SHAs and industry as requested/needed.
- Encourage SHAs to consider additional shadow testing for upcoming projects.
- Join FHWA in reminding SHAs or contractors/producers to participate in FHWA's PEM testing equipment loan program and PEM incentive opportunities.
- Explore the development of PEM construction specifications in cooperation with FHWA with SHAs and Industry.
- Continue efforts to expand participation in the TPF study by other states.
- Cooperate with AASHTO toward finalization of the PP 84-21, Standard Practice for Developing Performance Engineered Concrete Pavement Mixtures.
- PEM researchers will continue to advance tests and test refinements. They will also work with AASHTO to move tests forward to full standards.
- Provide the TAC with a periodic newsletter as an update to PEM activity and accomplishments.
- The Team will be providing updates and visiting with Industry TAC members in a call scheduled for July 22.
- As mentioned, we intend to have some regional discussion calls in the coming weeks/months to explore individual topics including training, PEM Phase 2, standard specifications for PEM and other topics of interest to the groups.

- In addition, the PEM Team and FHWA are also expanding the reach of the initiative through the “Advancing Concrete Pavement Technology Solutions” cooperative agreement. Work in this program includes development of a QC Guide for PEM and Precision and Bias Tests for testing methods that may be considered as acceptance tools.

Significant Results:

While construction activity has increased over the last quarter, the uncertainties related to the pandemic are certainly changing priorities and our ways of doing business, protecting our work force, and conducting the business of research and technology transfer in the “abnormal modus operandum”. However, we continue to see increasing interest and commitment to the PEM Initiative and the improvement that it promises for long term performance of concrete pavements. Despite the challenges, the PEM Team is continuing serve as a resource to agencies and industry regarding the PEM approach to assuring performance of concrete pavements. Interest and implementation consideration is growing from states, local paving groups, the national associations and individual contractors who are stepping forward to participate in shadow testing projects. Several SHAs are moving toward development of construction specifications, QC strategies and expanded data analysis. This illustrates good progress on our journey to PEM implementation. While there continues to be some concern about the predictions and reliability of PEM tests, the Team is moving forward to gather and synthesize data, new and old, that will help to confirm applicability to PEM objective. In addition to the accomplishments reported herein, we are moving forward with a plan to involve SHA and Industry TAC members in small task groups focused on training, implementation, QA/QC, and development of a PEM related construction specification. Finally, we are looking ahead to what the next phase of PEM for concrete pavements means with respect to aspects beyond just the mix.

Circumstances affecting project or budget (Describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope, and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).

TAC members

Praul, Mike / Federal Highway Administration
 Baer, Patricia / Pennsylvania Department of Transportation
 Richard Bradbury / Maine Department of Transportation
 Conway, Bob / Federal Highway Administration
 Covay, Jeff / Arkansas Department of Transportation
 Dennis, Dan / New York State Department of Transportation
 Hanson, Todd / Iowa Department of Transportation
 Hayes, Chad / Wisconsin Department of Transportation
 Hodges, Darin / South Dakota Department of Transportation
 Hunter, Brian / North Carolina Department of Transportation
 Krstulovich, James / Illinois Department of Transportation
 Lim, S. David / California Department of Transportation
 Masten, Maria / Minnesota Department of Transportation
 Meggers, Dave / Kansas Department of Transportation
 Mellons, Jason/Tennessee Department of Transportation
 Miller, Dan / Ohio Department of Transportation
 Praul, Mike / Federal Highway Administration
 Prieve, Eric / Colorado Department of Transportation
 Johnson, Daryl / Oklahoma Department of Transportation
 Staton, John / Michigan Department of Transportation
 Waters, Jason / Georgia Department of Transportation
 Wielenga, Craig / Idaho Transportation Department