

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) Quarter 2 (April 1 – June 30, 2020) Quarter 3 (July 1 – September 30, 2020) X 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	\$1,726,501.29	NA

Quarterly Project Statistics:

Total Project Expenses This Quarter	Total Amount of Funds Expended This Quarter	Percentage of Work Completed This Quarter
\$41,243.29		

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 December 31, 2020

- In response to suggestions offered after the SHA and Industry web meetings and acknowledging the inherent difficulties in encouraging much discussion in those larger virtual gatherings, the PEM Team has been conducting regional calls with agency and industry members of the TPF (as well as industry non-members of the TPF). Exchanges through the end of the year included **North Central** (Illinois, Iowa, Wisconsin and Minnesota), **Northeast** (Maine, Michigan, New York, Ohio and Pennsylvania), **Southeast** (Georgia, North Carolina, Tennessee and Arkansas) and **South Central** (Colorado, Kansas and Oklahoma). These successful interactions have allowed all to better understand SHA and industry progress and needs relative to experiences, concerns, and goals for implementation of the PEM initiative. Responses to questions that might better define where each state is at in the PEM implementation process and what their state or industry emphasis will be in the 2020 and 2021 construction seasons are included in the notes for each region and are available on the PEM website.
- PEM research/implementation team conversations have been held throughout the quarter. In addition to planning for the final two years of the TPF project, we are exploring alternative training possibilities and generating conversations about a second phase of PEM development and implementation.
- A reminder; SHA specification reviews have been completed with all of the TPF member agencies. The information collected during these interviews reveals the status of PEM implementation for each state. 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
- Team activities and calls are focused on continuing to encourage shadow testing, data collection and analysis, a construction specification incorporating PEM language, pilot projects and state/industry implementation.
- The PEM Team continues to collaborate 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.

- As in the past, PEM Team members are on call to respond to inquiries from pooled fund member SHAs and contractors/producers seeking guidance about testing and response to field issues. 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 when travel is permitted. FHWA has offered on-line test demonstration/training through the MCTC. It is still our intent is to assure that all SHAs are afforded one opportunity for local training. Currently, training has been provided for 12 of the 19 pooled fund member SHAs.
- With the leadership and dedication of Cecil Jones, the PEM Team is now working with Jesus Sandoval-Gill, new chair of the AASHTO 3C Committee Chair to advance PP-84 2021 through the COMP with hopes for seeking full standard status this year.
- PEM Team members Gordon Smith, Peter Taylor and Jason Weiss continue to visit with FHWA regarding collaborative efforts in moving forward with programs that could further the standardization of the PEM tests.
- In a related action, a new AASHTO Task Force has been established on “Concrete Resistivity and the Formation Factor” to address comments and look at TP 358, TP 119 and PP84 standards to assure proper terminology and address issues related to conditioning methods and geometry corrections.
- NCE and Oregon State University continue to analyze LTPP data and cementitious materials suspected for MRD.

Anticipated work next quarter:

- Complete a first round of regional virtual meetings in January . These gatherings are dedicated to discussion that helps us identify where each state is at in their PEM journey and what the implementation emphasis should be in the 2021 and 2022 construction seasons.
- The PEM Team will continue to review and provide a program that addressed the needs and objectives of the member states and industry for the remaining two years of the PEM pooled fund project.
- Collect, review and process 2020 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 that identify and define current and future needs for training of SHA, private engineering and industry audiences. We will work to develop and propose a PEM training program for future advancement of state/industry preparedness.
- 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.
- Explore the development of PEM construction specifications in cooperation with FHWA with SHAs and Industry.

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

Significant Results:

Without doubt, our world continues to change significantly as we wrestle with the COVID 19 pandemic. Hopefully a return to more normal activity will be possible in the second half of 2021. While our ways of communicating have changed and we have had to adjust to less travel to avoid exposure to the pandemic, our agencies and contractors continue the good works of highway stewardship. 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. Interest and implementation is growing. We are hearing 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. The Team is moving forward to gather and synthesize data, new and old, that will help to confirm applicability of key tests 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 define the next phase of PEM for concrete pavements, thinking beyond the mix and related tests.

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

Parry, Jim / Wisconsin 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