

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, 2019) Quarter 2 (April 1 – June 30, 2019) Quarter 3 (July 1 – September 30, 2019) X Quarter 4 (October 1 – December 31, 2019)	
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: 12/31/2019	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
\$1,617,500	\$1,314,583	NA

Quarterly Project Statistics:

Total Project Expenses This Quarter	Total Amount of Funds Expended This Quarter	Percentage of Work Completed This Quarter
\$289,918.48		

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, 2019

- The one day PEM workshop is now available to project sponsors. Please let us know if you would like to schedule.
- PEM research/implementation team meetings have been held throughout the quarter.
- A PEM TAC meeting was held on November 18-19, 2019 in Minneapolis.
 - Attendees included representation from: 11 DOTs, FHWA, Industry: PCA, ACPA(National and five Chapters/State Associations), NRMCA (RMCREF), SCA, and Admixtures.
 - Topics included: discussion of the PEM vision and where we are in the process, SHA presentations, industry presentations, conversation confirming our commitment to successful implementation to PEM.
- SHA specification reviews have been completed with the following:
 - Iowa
 - Illinois
 - Tennessee
 - Wisconsin
 - Colorado
 - Michigan
 - New York
 - Minnesota
 - Idaho
 - California
 - Kansas
 - South Dakota
 - Oklahoma
 - Georgia

The information collected during these interviews reveals the status of PEM implementation for each state. This was reviewed at the TAC meeting in November and discussion followed about

the need to continue progress with shadow testing, data collection and analysis, a construction specification incorporating PEM language, pilot projects and state/industry implementation.

- Nichols Consulting Engineers and Lisa McDaniel, IA Division FHWA, are collaborating with the CP Tech Center to populate and review the database for PEM shadow projects.
- The PEM Team is coordinating with the FHWA Mobile Concrete Technology Center (MCTC) to schedule 2020 state visits with industry supported PEM open houses. FHWA and the CP Tech Center have found this partnership for communicating the PEM message quite effective. PEM state visits planned for 2020 include: Idaho, Georgia and Oklahoma.
- As in the past, PEM Team members were on call to respond to numerous inquiries from SHAs and contractors/producers seeking guidance about testing and response to field issues.
- The PCA Products and Standards Committee requested and received a PEM update at a meeting in Orlando, FL on August 27, 2019.
- The CP Tech Center and WCPA (Wisconsin Concrete Pavement Association) presented a PEM progress report at the ACPA Annual meeting in New Orleans in early December.
- Members of the PEM Team continued conversations with SHA TAC members and industry to identify and arrange training for PEM tests. Training events this quarter included presentations/demo to CalTRANS in October and an Industry/Agency event in Buffalo, NY in early November.
- PEM Team members, led by Cecil Jones, completed work on the 2020 revision of the PP-84 Standard Practice for Developing Performance Engineered Concrete Pavement Mixtures. The revisions were submitted to AASHTO for comment and approval.
- PEM Team members also continued to correspond with an AASHTO Task Force that is reviewing proposed PEM tests developed by our researchers.
- Welcomed the Maine DOT as the 19th SHA participant in the PEM pooled fund initiative.

Anticipated work next quarter:

- The PEM Team will review and program the needs and objectives for the remaining three years of the PEM Pooled Fund project as discussed and confirmed at the November TAC meeting.
- Develop an inventory of existing state PEM test data, review and process using the data entry spreadsheet.
- Receive, review and process shadow test data using data entry spreadsheet. Synthesize the information and make it readily available to all TAC members and interested parties.
- Work with SHAs and industry to establish their individual PEM implementation strategies.
- Cooperate with TAC and a Task Group to identify and define current and future needs for training of SHA, private engineering and industry audiences. We will follow with completion of first round training proposed for each state. Then we will work to develop and propose a PEM training program for future advancement and state/industry preparedness.
- Complete specification reviews/recommendations and related conversation with SHA TAC members. (Arkansas, Maine, Pennsylvania, Ohio and North Carolina). The information will be summarized, reviewed by each state for accuracy and shared with the TAC members.
- Schedule and present the one-day engineering level PEM Workshop for 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.

- Monitor, assist, advise SHAs in an extended FHWA Incentive Program for additional shadow testing on 2020 projects.
- 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.
- Advance development of PEM construction specifications in cooperation with FHWA with SHA involvement.
- Continue efforts to expand participation in the TPF study by other states.
- Persist with the ongoing review and update of PP 84-21, Standard Practice for Developing Performance Engineered Concrete Pavement Mixtures. Our goal is to move the PEM tests to Standards Tests as we finalize the practice itself.
- In addition to the PEM TPF work, the PEM Team and FHWA are expanding the reach of the initiative through a the new "Advancing Concrete Pavement Technology Solutions" through resources provided in the current highway legislation. Early work areas in this supplemental included development of a QC Guide for PEM and Precision and Bias Tests for testing methods.
- 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.

Significant Results:

Now into the third year of the PEM TPF Initiative, the project continues to place considerable effort to inform agency and industry about the PEM approach to assuring performance of concrete pavements. Based on comments offered at the November PEM TAC meeting, we have confirmed a growing interest 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.

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, Michael J./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