

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: <input checked="" type="checkbox"/> Quarter 1 (January 1 – March 31, 2019) <input type="checkbox"/> Quarter 2 (April 1 – June 30, 2019) <input type="checkbox"/> Quarter 3 (July 1 – September 30, 2019) <input type="checkbox"/> 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 / Gordon Smith	Phone: 515-294-9333	E-mail: ptaylor@iastate.edu / glsmith@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:	Number of Extensions: Ongoing 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
\$1,345,000	\$672,544.76	NA

Quarterly Project Statistics:

Total Project Expenses This Quarter	Total Amount of Funds Expended This Quarter	Percentage of Work Completed This Quarter
\$200,441.21		NA

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 with a growing 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, and with 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 March 31, 2019

- PEM test methods and accompanying videos have been finalized and are being distributed to TPF SHA and industry partners for their immediate use. We encourage all to assure that shadow testing is conducted in a consistent manner that will provide optimum test verification, thorough data analysis and advancement of the PEM initiative. If you have questions, please call any of our PEM Team members.
- In January at TRB, PEM Team members gathered in Washington, D.C. to review accomplishments, upcoming activities and to discuss implementation strategies for 2019 and beyond.
- PEM was a featured topic at a 2019 TRB Workshop entitled “QA in Construction and Smart Technology”.
- PEM updates were presented at concrete paving workshops in SD, IA, MN, MO/KS, CO/WY, NY, WI, MI, OH, for the American Coal Ash Association meeting(Houston) and at PCA and NRMCA committee meetings in Tampa, FL
- The CP Tech Center joined the FHWA, Golden Triangle Construction Co., and PennDOT to offer a PEM focus session at the ACPA-PA Concrete Conference in Harrisburg, PA. The FHWA Mobile Concrete Trailer (MCTC) and staff were on site to exhibit and discuss PEM and general concrete testing innovations.
- Concrete paving specifications from the seventeen PEM pooled fund states have been collected and noted. The CP Tech staff is conducting a review process that will allow us to provide recommendations for individual SHA spec adjustments intended to improve quality and durability of concrete mixes.
- Members of the PEM Team continue conversations with SHA TAC members and industry to identify and arrange training for PEM tests. Tyler Ley and his group provided SAM training in WI(2), ID and MI this quarter.

- SHA TAC members were recently contacted by PEM team members to visit about and determine individual state agency implementation plans, progress and needs. These talks confirmed that PEM shadow testing will be conducted in a number of the PEM states during the 2019 construction season. Five states will be completing the tests with support from the FHWA PEM Incentive program.
- Our SHA visits confirmed that, to date, PEM Open Houses, likely in cooperation of the FHWA MCTC, are planned this year in NC, KS, and CA. The CP Tech trailer will assist in IL and ID.
- We continue work with Tom VanDam and staff at Nichols Consulting Engineers along with Lisa McDaniel, IA Division FHWA, to update the PEM database and data collection. In addition, the State DOT Data Entry Spreadsheet is being modified to simplify use by the states. This spreadsheet will be imported into the PEM database with shadow test data. Data from projects in IA, SD and PA is or will soon be available and entered into the record.
- PEM Team members, led by Cecil Jones, have begun work on the 2020 revision of the PP-84, Standard Practice for Developing Performance Engineered Concrete Pavement Mixtures. Proposed changes will be shared with industry for review and comment and the revised document will be submitted to the AASHTO COMP Technical Committee for comment and action in the second quarter.
- Jason Weiss has provided two webinars to AASHTO on the formation factor, presented on concrete resistivity at TRB, provided formation factor video and test procedure for the PEM website and developed slides for the one day engineering level workshop.
- Tyler Ley has provided SAM training, completed hardened air tests from shadow projects in IA & WI, provided a SAM test procedure for the PEM website and developed slides for the one day engineering level workshop. Tyler also spoke at meetings in WI and MN.
- We continue to correspond with an AASHTO Task Force reviewing proposed PEM tests developed by our researchers.
- As in the past, PEM Team members are on call to respond to numerous inquiries from states and contractors/producers who were seeking guidance about testing and response to field issues.
- Concrete paving specifications have been gathered from each of the TAC SHAs. The Team is conducting a review process that will allow us to provide recommendations for individual SHA spec adjustments intended to improve quality and durability of concrete mixes.
- Refinements of the PEM Website are ongoing. Users will find valuable information about PEM, test method summaries, test procedures, videos, state dot data entry sheet, slideshows or YouTube links, a schedule of shadow projects and information pertinent to test data entry. The link is www.cptechcenter.org/pem.

Anticipated work next quarter:

- Complete specification reviews/recommendations and related conversation with SHA TAC members
- Schedule pilot and subsequent presentations of a one day engineering level PEM Workshop for interested agencies and industry
- A SHA TAC member call is scheduled for April 17, 2019. An Industry TAC member call will be scheduled in the second quarter, 2019, to provide updates on PEM progress and discuss proposed implementation strategies.
- Establish date(s) and location for the next face-to-face full PEM TAC meeting

- Plan and present PEM Workshops/Demos in conjunction with FHWA MCTC visits in NC, KS & CA with CP Tech trailer visits in IL and possibly ID
- Monitor, assist and advise on FHWA Incentive Program shadow testing for 2019 projects (WI, IL, NC, KS, MN, CO). Offer remaining SHA's guidance on project selection and a sample testing plan.
- Continue general outreach and assistance to SHAs and industry as needed.
- Encourage SHAs to consider additional shadow testing on upcoming projects. (MI, NY, WI, IA, PA)
- Work with SHAs and industry to establish each state's PEM implementation strategies.
- Join FHWA to encourage SHAs or contractors/producers to participate in FHWA's PEM testing equipment loan program.
- Appoint a small task group to work with states advancing toward development of PEM construction specifications (NY, WI, MI)
- Continue efforts to expand participation in the TPF study to other states.
- Persist in the ongoing review and update of PP 84-20, Standard Practice for Developing Performance Engineered Concrete Pavement Mixtures .
- Communicate with FHWA to coordinate additional PEM activities that will be included in the new "Advancing Concrete Pavement Technology Solutions" cooperative agreement. Key topics: QC Guide for PEM, promote implementation of QC concepts with state oversight/involvement in monitoring, and Precision and Bias Tests for testing methods.
- PEM researchers will continue to advance potential PEM tests and test refinements. We will also collaborate with AASHTO to move tests forward to standards as they deem appropriate to the PEM initiative.
- Identify and define needs for training of SHA, private engineering and industry audiences. We will then follow with appropriate, alternative training tools and strategies. Appoint a small task group to guide in this endeavor.
- SAM training in KS.
- Further develop the CPTech/PEM website to include FHWA and SHA reports on incentive projects with shadow testing and MCTC visits. This would constitute a feedback loop on state PEM experiences, specifications and things learned.

Significant Results:

The first year and a half of the PEM TPF project has seen considerable effort expended to inform agency and industry about the PEM initiative. We are seeing encouraging interest from states, local paving groups, the national associations and individual contractors who are stepping forward to participate in shadow testing projects. Interest in training, future construction specifications, QC strategies and data analysis combine to suggest that we have a good start on the journey toward PEM implementation. In 2019, more than half of the participating SHAs will be involved with shadow testing and verification of PEM tests intended to assure long term concrete pavement performance in its specific environment. In addition to the reported accomplishments, 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 the 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

Ahlstrom, Gina and Mike Praul / Federal Highway Administration
Baer, Patricia / Pennsylvania Department of Transportation
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
Prieve, Eric / Colorado Department of Transportation
Johnson, Daryl / Oklahoma Department of Transportation
Staton, John / Michigan Department of Transportation
Wielenga, Craig / Idaho Transportation Department