

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) X Quarter 3 (July 1 – September 30, 2019) 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:	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	\$1,024,664.52	NA

Quarterly Project Statistics:

Total Project Expenses This Quarter	Total Amount of Funds Expended This Quarter	Percentage of Work Completed This Quarter
\$98,994.34		

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 September 30, 2019

- A one day PEM workshop is now available to project sponsors.
- Research team meetings have been held throughout the quarter.
- A PEM TAC meeting has been scheduled for November 18-19, 2019 in Minneapolis.
- A State/FHWA Advisory Task Force held two calls to offer guidance for the PEM initiative.
- SHA specification reviews have been completed with the following:
 - Iowa
 - Illinois
 - Tennessee
 - Wisconsin
 - Colorado
 - Michigan
 - New York
 - Minnesota
 - Idaho
 - California
 - Kansas

The information collected reveals status of PEM implementation for each state. This will be reviewed at the upcoming TAC meeting in November.

- We continue work with Tom VanDam and staff at Nichols Consulting Engineers and Lisa McDaniel, IA Division FHWA, to populate and review the database for PEM shadow projects.
- The FHWA Mobile Concrete Technology Center (MCTC) visited a Kansas PEM shadow project in August. The project was on I-70 in Northwest Kansas, where a site visit was held on August 1, 2019. FHWA, KDOT, Missouri/Kansas Chapter/ACPA and the CP Tech Center hosted a PEM open house at the District 1 office in Topeka, KS on August 8, 2019. Members of FHWA and Kansas DOT demonstrated the V-Kelly test, Box test, Super Air Meter (SAM) and the surface resistivity test at the MCTC in the afternoon portion of the open house. 60 people representing FHWA, Kansas DOT, academia, consultants and industry attended the Kansas event.

- The CP Tech Center also collaborated with the Illinois DOT to present a PEM Open House in conjunction with a shadow testing project on I-74 near Moline, August 6, 2019. Illinois DOT and the CP Tech Center demonstrated the V-Kelly test, Box test, Super Air Meter (SAM) and the surface resistivity test at a nearby ready mix plant. There were 49 in attendance representing, Illinois DOT, consultants and industry.
- This construction season, the Minnesota DOT is conducting shadow testing on projects on Trunk Hwy 60 near St. James and I-35W/Lake Street in Minneapolis. PEM shadow project was held on I-84 in Mountain Home, Idaho. The project collected SAM data that will be shared with the team. Contractors in Iowa and Pennsylvania are continuing shadow testing on selected projects in cooperation with the respective departments.
- As in the past, PEM Team members were on call to respond to numerous inquiries from states and contractors/producers seeking guidance about testing and response to field issues.
- FHWA and CP Tech Center participated in a PEM Workshop in conjunction with the ASCE International Highways and Pavements Conference in Chicago on July 21, 2019.
- The PCA received a PEM update at their Products and Standards Committee meeting in Chicago on August 27, 2019.
- The NCC Fall meeting in Kalispell, Montana, September, 10-13, 2019 included a PEM meeting and presentations.
- Members of the PEM Team have continued conversations with SHA TAC members and industry to identify and arrange training for PEM tests.
- 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. It has been submitted to AASHTO.
- PEM Team members continue to correspond with an AASHTO Task Force reviewing proposed PEM tests developed by our researchers.
- Test method information has been coordinated directly with the following states to ensure test process consistency: Kansas, Wisconsin, Minnesota, Illinois, Idaho and Michigan.
- In the monitoring task, review and discussions with AASHTO on test methods and responses to voting, in the test refinement task, effort has been spent on strength scaling/

Anticipated work next quarter:

- Receive, review and process shadow test data using data entry spreadsheet.
- Complete specification reviews/recommendations and related conversation with SHA TAC members.
- Schedule and present the one day engineering level PEM Workshop for interested agencies and industry.
- A face-to-face, full TAC meeting is scheduled for November 18-19, 2019 in Minneapolis. In addition to reviewing SHA progress in implementation, the TAC and PEM Team will review/confirm needs and objectives for the remaining three years of the PEM Pooled Fund project.
- Monitor, assist, advise in FHWA Incentive Program shadow testing on 2019 projects (CA, ID)
- General outreach and assistance to SHAs and industry as needed.
- Encourage SHAs to consider additional shadow testing on upcoming projects.
- Work with SHAs and industry to establish PEM implementation strategies.
- Join FHWA in reminding SHAs or contractors/producers to participate in FHWA's PEM testing equipment loan program and PEM incentive opportunities.

- Commence discussions to advance development of PEM construction specifications.
- Continue efforts to expand participation in the TPF study to other states.
- Ongoing review and update of PP 84-20, Standard Practice for Developing Performance Engineered Concrete Pavement Mixtures
- Work 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 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 standards as they deem appropriate to the PEM initiative.
- Cooperate with TAC and a Task Group to identify and define needs for training of SHA, private engineering and industry audiences. We will then follow with appropriate training opportunities and methodologies.
- A PEM test training event will be held in Buffalo, NY in November in response to a request from industry.
- Provide PEM test training to CalTrans in late October.
- Provide newsletter update to TAC.

Significant Results:

During the first two years of this initiative, the PEM TPF Pooled Fund Project has focused considerable efforts to inform agency and industry about the PEM initiative. We continue to see growing 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 there is good progress on our journey to PEM implementation. At the PEM TAC meeting in November, we will show evidence of the progress as we review the SHA specification status and implementation plans for assuring long term concrete pavement performance in it's 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 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
 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