# 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.*

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|---|---|
| **Transportation Pooled Fund Program Project #**<br>*TPF-5(368)* | **Transportation Pooled Fund Program - Report Period:**<br>Quarter 1 (January 1 – March 31, 2022)<br>Quarter 2 (April 1 – June 30, 2022)<br>x Quarter 3 (July 1 – September 30, 2022)<br>Quarter 4 (October 1 – December 31, 2022) |

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|---|---|---|
| **Project Title:**<br>Performance Engineered Concrete Paving Mixtures | | |
| **Project Manager:**<br>Todd Hansen | **Phone:**<br>239-1471 | **E-mail:**<br>todd.hansen@dot.iowa.gov |
| **Project Investigator:**<br>Peter Taylor | **Phone:**<br>515-294-9333 | **E-mail:**<br>ptaylor@iastate.edu |
| **Lead Agency Project ID:** | **Other Project ID (i.e., contract #):**<br>Addendum 629 | **Project Start Date:**<br>10/1/17 |
| **Original Project End Date:** | **Current Project End Date:**<br>12/31/2022 | **Number of Extensions: PFS** |

Project schedule status:

X 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 |
|---|---|---|
| $2,230,000 | $1,973,922 | NA |

***Quarterly*** Project Statistics:

| Total Project Expenses This Quarter | Total Amount of Funds Expended This Quarter | Percentage of Work Completed This Quarter |
|---|---|---|
| $59,939 | | |

**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.):**

- With Iowa DOT leadership, a new pooled fund project has been established to incorporate continued support for PEM and an extended scope of work that further encourages agencies to consider specifiation changes and field procedures to enhance concrete pavement performance and make concrete more sustainable. Details for this new pooled fund can be found at: https://www.pooledfund.org/Details/Solicitation/1582. This initiative will again be a joint agency/industry collaboration. The CP Tech Center is working with agency and industry to define and consider needs beyond the mix, exploring operational innovations that can further advance concrete pavement reliability. If a State Agency is interested, please check out the detail at https://www.pooledfund.org/Details/Solicitation/1582 and join others in maintaining a focus on durable concrete that performs to expectation or beyond.

- Activities in the past quarter included calls with agencies focusing on data collection and analysis, a construction specification incorporating PEM language, and state/industry PEM implementation. Calls were made to Wisconsin, New York and North Carolinato request shadow test data.

- The PEM team has continued to collaborate with FHWA's Mobile Concrete Technology Center (MCTC), training, assistance and PEM Open Houses. In August 2022, CP Tech and the Iowa Concrete Paving Association joined FHWA presenting a half day PEM event at INTRANS in Ames, IA. Presentations about PEM and the related tests were followed by demonstration of tests and new technology at the MCTC trailer. CP Tech staff also worked with the MCTC as we gathered information on a MN Road project in August. Each of the participating SHAs have been contacted to offer training. All of the SHAs that have expressed interest have received local training. In follow up to the Geogia DOT PEM workshop held March 8 & 9, planning is underway for the CP Tech Center to provide sampling, testing and training on a paving project this Fall utilizing PEM methods. The DOT is also planning a pilot project with an optimized aggregate gradation mixture as a result of the workshop.

- Under the FHWA Cooperative agreement, members of the PEM Team will now schedule a precision and bias testing event for SAM, Box and VKelly in in March of 2023, hopefully to assure adequate availability of testers and new VKelly equipment . FHWA has also approved a plan for precision and bias work on resistivity. Dr. Jason Weiss is coordinating with various laboratories for this work. All of these activities will assist in moving forward with full standardization of the PEM tests and providing assurance of dependability.

- A quick reminder to all: the AASHTO Provisional Standard PP84 has now advanced to Full Standard, R 101.

- NCE is continuing to manage the sampling and reporting of the test results from the SPS-2 sites. 101 cores from six states were sampled and delivered to Oregon State University and Oklahoma State University. Oklahoma State University has completed hardened air testing and has sent information to NCE. Oregon State is finalizing lab testing and analysis of LTPP data and cementitious materials suspected for MRD. Testing includes, oxychloride, porosity and resistivity. Oregon State has also received sand samples from pooled fund states to futher explore resistivity test results with respect to porous aggregate.

- Work continues on the TRB Circular focusing on the PEM experience from the following state agencies: New York, Iowa, Michigan, North Carolina and Wisconsin.

**Anticipated work next quarter:**

- In the coming months, the PEM team will continue to focus considerable time on completing a summary report of the accomplishments of the PEM Pooled Fund Project, TPF-5(368) This project concludes at the end of this year. We hope to schedule a TAC meeting in December for the purpose of presenting and discussing the report and it's conclusions.
- Ongoing discussion with state and industry will help us to develop interest in a future TPF initiative that will continue to support for PEM implementation and further work in the area to improve paving processes beyond the mix and further enhance concrete pavement performance. (SPEC) in today's environment.
- Snyder and Associates will be contacting state agencies that have completed additional PEM shadow testing to obtain test data. The data will be added to the PEM database and reviewed for general trends and test performance. The research team will synthesize the information in the form of data plots with an accompanying narrative,adding this to the final report.
- Provide general outreach and assistance to SHAs and industry as requested/needed.
- Encourage SHAs to consider additional shadow testing for upcoming projects and share test data with the research team.
- A proposal for the development of a model PEM construction specification in cooperation with FHWA, SHAs and Industry will be included in the workplan for year 4 of the FHWA cooperative agreement.
- Develop and present a webinar on SAM testing to include the latest test updates.

**Significant Results:**

During this final year of the PEM initiative, we continue to see increasing interest and commitment to the PEM principles, recognizing the improvement that implementation promises for enhanced long term performance of concrete pavements. We continue to hear 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 continuing progress on our journey to PEM implementation. As mentioned earlier, 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. We are also encouraging agency and industry support for a second 5 year pooled fund project, *Sustainable Performance Engineered Concrete(SPEC)*. It's purpose is to continue support in implementation of PEM and thinking beyond the mix and related tests to specifications and field operations. Please join us.

**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 & Bob Conway / Federal Highway Administration
Baer, Patricia / Pennsylvania Department of Transportation
Richard Bradbury / Maine Department of Transportation
Covay, Jeff / Arkansas Department of Transportation
Dennis, Dan / New York State Department of Transportation
Dietz, Dana / Idaho Transportation Department
Hanson, Todd/ Iowa 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
Wadley, Dan / Kansas Department of Transportation
Mellons, Jason/Tennessee Department of Transportation
Miller, Dan / Ohio Department of Transportation
Parry, Jim / Wisconsin Department of Transportation
Prieve, Eric / Colorado Department of Transportation
Johnson, Daryl / Oklahoma Department of Transportation
Bahmer, Thomas / Michigan Department of Transportation
Waters, Jason / Georgia Department of Transportation