

## 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.*

<b>Transportation Pooled Fund Program Project #</b> TPF5(498)-8H-00	<b>Transportation Pooled Fund Program - Report Period:</b> X Quarter 1 (January 1 – March 31) Quarter 2 (April 1 – June 30) Quarter 3 (July 1 – September 30) Quarter 4 (October 4 – December 31)	
<b>Project Title:</b> VKelly Slipform Paving Vibration Test TPF-5(498)		
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<b>Lead Agency Project ID:</b>	<b>Other Project ID (i.e., contract #):</b> Addendum 843	<b>Project Start Date:</b> 04/01/2023
<b>Original Project End Date:</b> 03/31/2025	<b>Project End Date:</b> 07/30/2026	<b>Number of Extensions:</b>

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
\$195,000	\$175,868	85%

Quarterly Project Statistics:

Total Project Expenses This Quarter	Total Amount of Funds Expended This Quarter	Percentage of Work Completed This Quarter
\$13,960		5%

## **Project Description:**

The aim of the work is to:

1. Model how the test works as a function of concrete properties
2. Investigate how mixtures affect VKelly results and how they correlate with rheology parameters
3. Modify the test to work with mixtures with slumps greater than 3"

## **Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):**

For Quarter Ending Mar 31, 2026:

- A paper is being prepared regarding the development of the model behind how the test works.
- A limited number of test using the larger head have been conducted and the data are being analyzed.
- The student working on this project successfully defended her MS.
- A machine has been sent to a commercial lab to conduct the testing on mixture ingredient effects.
- A TAC meeting was held on March 23. We discussed potential field activities using some additional funding available.

For Quarter Ending Dec 30, 2025:

- The literature review is completed and will be submitted to a journal.
- A paper is being prepared covering the model has been accepted for presentation at TRB
- Gravel aggregates have arrived and mixtures have been completed
- The test frame has to be modified to accommodate the larger head for higher slump mixtures and tests have continued

For Quarter Ending Sept 30, 2025:

- The literature review is completed and in for editing. A paper based on the review will be submitted to a journal.
- A paper is being prepared covering the model has been accepted for presentation at TRB
- Gravel aggregates have arrived and mixtures are being tested
- The test frame has to be modified to accommodate the larger head for higher slump mixtures and tests have been started
- Revisiting the aim of comparing the data from the VKelly with the ICAR rheology device. Reportedly the device is not rugged enough to handle testing under vibration.

For Quarter Ending June 30, 2025:

- Dynamic viscosity calculations have been completed. A paper is being prepared covering the model. There seems to be a good correlation between VKelly Index and Dynamic Viscosity
- Gravel aggregates have arrived and mixtures are being tested
- The test frame has to be modified to accommodate the larger head for higher slump mixtures

For Quarter Ending March 31, 2025:

- Revisions have been made to the modelling spreadsheet allowing prediction of the effects of operating parameters on VKelly index
- MNDOT and ISU data have been analyzed and correlated with dynamic viscosity
- Gravel aggregates have been ordered to assess effects of aggregate type on VKI
- A larger head has been obtained for use in higher slump mixtures

For Quarter Ending December 31, 2024:

- MNDOT Data have been analyzed and correlated with viscosity
- Additional lab tests have been conducted
- A larger head has been ordered for use in higher slump mixtures

For Quarter Ending September 30, 2024:

- The device has been updated so that movement data are transferred by bluetooth to a phone or tablet making the device operable by one person
- The device was used at the MNDot test facility to track low carbon mixtures used in 8 new cells. The data are being analyzed in detail and spreadsheets developed to facilitate rapid assessment of the results

For Quarter Ending June 30, 2024:

- Work continues on being able to produce repeatable results from the device. Staff are learning about the importance of moisture control in the aggregates.
- Hardware has been obtained to make the connection to a phone or tablet wireless, further simplifying operation. The system is being assembled.
- Working on obtaining an ICAR rheometer, or similar, to help relate data with VKelly readings

For Quarter Ending March 31, 2024:

- The modified device with an automated rate system required some troubleshooting. Several successful test runs have been completed and data are being analyzed.
- Materials are being gathered to start the formal test program.

For Quarter Ending December 31, 2023:

- The student reviewed and corrected the model being used to predict how the device may be expected to behave. An initial literature review has been prepared and is being reviewed. A critical part of this effort is understanding the parameters related to mixture flow and vibration energy.
- The modified device with an automated rate system was received on December 21. Work is starting connect it to a computer and calibrate it.

**Anticipated work next quarter:**

- It is planned to complete lab tests this quarter including mixtures with gravel coarse aggregate and using the larger head
- A draft report will be prepared
- A plan and budget will be prepared for field tests in all the sponsoring states.

**Significant Results:**

- Analysis of the MNRoad data indicated that the device seems to be useful in reporting dynamic viscosity in low slump mixtures. This can be critical in future proportioning approaches and in machine control technologies.