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(300)*	**Transportation Pooled Fund Program - Report Period:** Quarter 1 (January 1 – March 31, 2016) X Quarter 2 (April 1 – June 30, 2016) Quarter 3 (July 1 – September 30, 2016) Quarter 4 (October 1 – December 31, 2016)

Project Title: Performance and Load Response of Rigid Pavement Systems		
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Lead Agency Project ID:	**Other Project ID (i.e., contract #):** Addendum 504	**Project Start Date:** 5/29/14
Original Project End Date: 5/31/2017	**Current Project End Date:** **5/31/2019**	**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
$1,770,000	414,433.25	34%

Quarterly Project Statistics:

Total Project Expenses This Quarter	Total Amount of Funds Expended This Quarter	Percentage of Work Completed This Quarter
$54,915.55		2%

Project Description:

The modern approach to highway design is embodied in the Mechanistic-Empirical Pavement Design Guide (MEPDG), which incorporates models embedded in dedicated software, such as AASHTOWare Pavement ME Design, to predict pavement performance in greater detail than before. Full implementation of the MEPDG by state departments of transportation requires customizing or calibrating the software to state and local conditions, which in turn requires collecting data on climate, material properties, load response, and pavement performance.

The MEPDG software uses these data inputs to more accurately simulate the load response of pavements and long-term pavement performance. Local calibration of the software involves comparing long-term performance simulation results to actual performance data at local sites if possible or from matching pavements in the LTPP database. New York is one of the states that have previously instrumented test pavement sections to acquire local data to improve calibration of the MEPDG software. The installed sensors are still functioning to an extent that permits collection of additional useful data. This project has these objectives:

- Collecting load response and performance data and environmental monitoring at selected test pavements in New York for four years.
- Installing new instrumented sections as needed for a better understanding of rigid pavement response, including monitoring for the duration of the project.
- Determining the impact of a base on long-term performance of rigid pavement utilizing the data acquired in fulfilling the first two objectives and other nationally available data on the topic.

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

NYSDOT priority task list:

- Task 1. Develop relationships between PCC slab thickness and pavement performance
- Task 2. FWD Analysis Procedures

Work for the NYSDOT is progressing on several points.

1. Generation of additional data and tables for the MEPDG catalog is continuing in response to the comments provided by the liaison. Tables are being constructed for the various parameters, including: PCC pavement thickness, Truck ESALs, IRI, faulting, and cracking.
2. NY DOT expressed interest in pursuing further investigation of the overlay procedure using AASHTOWare Pavement-ME, this is will be added to the NYSDOT priority task list.
3. On May 16-20, the RT9A project site was visited. The objective was to finish pulling sensor wires into the pull box. However, the pull cords had not been installed at the time, and cabinet keys were not immediately available, so the planned work could not be completed. A request was made to NY DOT to install the pull cords and to provide a set of box keys to the researchers. The installation work was completed at the end of June, and the research ream is planning to return in the coming quarter.
4. The I86 project site was visited June 28-30. Distress surveys were conducted on all the test sections, which were observed to be be in good condition. A further summary appears later in this report. FWD data were also collected at each site for future analysis.

Anticipated work next quarter:

- Continue creating design tables for NYSDOT regions per Item 1 above.
- Discussions are continuing on selection of a site for instrumented pre-cast slabs.

- A one week trip to the I90 and I490 projects. During those site visits FWD data will be collected in addition to the sensor data and distress surveys. If possible, dynamic truck runs will be conducted on the I90 project.
- Visit to RT9A site to complete site work that could not be completed in the last visit.
- Begin analysis of FWD data once they have been provided to the research team

Significant Results:

Report on June 2016 distress survey of I86, Cattaraugus County eastbound sections with JPCP placed on untreated, rubblized, and cracked and seated pavement.

Work Overview

The first day (6/28) was spent making the FWD operable with the help of the Allegany County garage mechanics. Deflection readings were unrealistically high (about 60 mil (1.5 mm)) because a stabilizing rod had fallen out of the "D1" deflection sensor (located on top of the load plate). After repair, the FWD was tested for repeatability and the deflections were consistent and realistic.

The team worked overtime to conduct the distress surveys and collect FWD data on the following day (6/29) for all the PCC sections in Hinsdale. A detailed station list was made to locate cracks as well as landmark objects that would not move over time. A survey wheel was used track the approximate longitudinal distance of these points relative to zero (beginning point of section). Detailed notes were taken with the FWD operator to ensure that future measurements are made at the same points.

Distress Surveys

JPCP I-86 E (No Treatment)

The FWD and survey wheel was zeroed at the AC/PCC interface in the eastbound lane. FWD tests were performed along the section mid-slab and at the approach and leave of each joint. A total of 354 locations were tested in about 1800 feet (550 m) of pavement within the untreated section. The full length of the section (2842 ft (866 m)) was walked and mapped by the surveyors noting landmarks at specific foot marks that could be tied back to the AC/PCC zero point. For example, the "Mile 87" sign was located 290.5 ft (89 m) east of the AC/PCC interface. Along with mapping landmarks, distresses were noted along the section. Typical distress types found included longitudinal cracking, transverse cracking, corner breaks, joint spalling, and faulting.

A 500 foot (150 m) sub-section was selected for a detailed distress survey and crack count. This sub-section began 250 feet (76 m) west of the "middle" LVDT sensor. Overall, there were very few distresses to note along the sub-section. However, the JRI plastic (Spanish) joints did show areas with spalling and corner breaks. A Georgia Digital fault meter was used to measure faulting across 56 joints in the section. Faulting was measured both 0.3 m (12 in) and 0.75 m (30 in) from the edge of pavement for each joint; there were no faults greater than 0.3 mm (12 mil).

During the survey, the weather was overcast with pavement temperatures ranging from 70°F (21°C) from the beginning to 72°F (22°C) at the end of the survey.

JPCP I-86 E (Rubblized)

The FWD and measured survey began at the "17 5112 5086" sign that was used as the zero point, which was the joint closest to the first LVDT hole in the rubblized section. A total of 102 locations were tested with the FWD along 500 ft (150 m) of pavement. The locations tested with the FWD were similar to the "untreated" section. The full length of the section (2600 ft (790 m)) was walked with a survey wheel to locate distresses and landmark points. There were moderate and low severity transverse cracks to note (at 42 ft (12.8 m) and 1053 ft (321 m), respectively) as well as a low severity popout located about 10 in (25 cm) from the edge of pavement in the driving lane at 1814 ft (553 m). There were no severe distresses. A 500 ft (150 m) sub-section was selected for mapping which began 1000 ft (305 m) east of zero. There was a low-severity corner break in the sub-section at 1030 ft (314 m). There was no faulting greater than 0.2 mm (8 mil). The sun began to come out during the survey, increasing the pavement temperature, which ranged from 72°F (22°C) to 86°F (30°C).

JPCP I-86 E (Crack and Seat)

The zero point for the crack and seat section was the "17 5112 5091" sign. There 100 locations tested with the FWD, covering about 500 ft (150 m) of pavement. The full length of the section (2850 ft (786 m)) was walked with a survey wheel to note permanent landmarks and distresses. The JRI plastic (Spanish) joints had low-severity spalling. There were a couple low-severity corner breaks at 1424 ft (434 m) and 1432 ft (436 m) and one instance of spalling in a center line longitudinal joint at 1586 ft (483 m). A 500 ft (150 m) sub-section was selected for distress mapping which began 882 ft (269 m) east of the "17 5112 5091" sign. The mapping included the distresses in the JRI plastic joints but no other distresses to note. No faulting was greater than 0.1 mm (4 mil). Pavement temperatures began to rise higher, ranging from 86°F (30°C) to 95°F (35°C) from the beginning to the end of the survey. The team made unsuccessful attempts to download data from the weather station.

Distress Summary

In general, the distress observed in the test sections is consistent with previous distress surveys. The test sections are all performing well with minor distresses as noted. The untreated PCC test section had slightly more distress then either the rubblized or crack and seat sections.

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).

The release of Version 2.3 of the AASHTOWare Pavement-ME software is imminent. It will be installed when it is provided to the researchers. The results generated with Version 2.1 of the software need to be validated using the newest version as the calibration coefficients have been changed.