

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): _____ Minnesota Department of Transportation _____

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 # TPF (148): The Effects of Implements of Husbandry "Farm Equipment" on Pavement Performance (MnROAD Study)" | Transportation Pooled Fund Program - Report Period: <input checked="" type="checkbox"/> Quarter 1 (January 1 – March 31) <input type="checkbox"/> Quarter 2 (April 1 – June 30) <input type="checkbox"/> Quarter 3 (July 1 – September 30) <input type="checkbox"/> Quarter 4 (October 4 – December 31) | |
| Project Title: The Effects of Implements of Husbandry "Farm Equipment" on Pavement Performance (MnROAD Study)" | | |
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| Project Investigator: Lev Khazanovich Phone: 612-624-4764 E-mail: khaza001@umn.edu | | |
| Lead Agency Project ID: | Other Project ID (i.e., contract #): | Project Start Date: |
| Original Project End Date: Jan.2011 | Current Project End Date: Sept. 2011 | Number of Extensions: 1 |

Project schedule status:

- On schedule
 On revised schedule
 Ahead of schedule
 X Behind schedule

Overall Project Statistics:

| Total Project Budget | Total Cost to Date for Project | Total Percentage of Work Completed |
|----------------------|--------------------------------|------------------------------------|
| \$430,000 | \$388,000 | 90% |

Quarterly Project Statistics:

| Total Project Expenses This Quarter | Total Amount of Funds Expended This Quarter | Percentage of Work Completed This Quarter |
|-------------------------------------|---|---|
| \$15,000 | | 3.5% |

Project Description:

Over the past few decades, there have been significant changes in both farm size and farm equipment. These factors, combined with a regulatory emphasis that has encouraged farmers to store manure as a liquid and apply it in a short time frame, have encouraged the farm equipment industry to produce larger manure hauling and application equipment. The shift to larger and heavier equipment has occurred at a faster rate than pavement design, materials technology, or state regulatory structures could match. Today, equipment innovations such as steerable axles, flotation tires, and new tire designs are not reflected in state DOT regulations. This situation has led to the adoption of equipment and practices that, while complying with the letter of the law, may actually create more pavement damage. The objectives of this study are to determine pavement response under various types of agricultural equipment (including the impacts of different tires and additional axles) and to compare this response to that produced by a typical 5-axle tractor-trailer. New test sections will be constructed at MnROAD for this research for testing overweight vehicles from farming and a number of other industries. The pavement response collected under this study will be used to calibrate the analytical models for prediction of relative damage caused by heavy farm equipment.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):**Task 1. Design Experimental Pavement Sections**

This task has been completed.

Task 2. Database Development

This task has been completed.

Task 3. Predict Pavement Responses

This task has been completed.

Task 4. Construction of the Test Sections

This task has been completed.

Task 5. Pavement Response Monitoring

The task report has been finalized and submitted in January of 2011. It included a comprehensive summary of the field tests performed in 2008-2010 and a description of the data collected in the field tests.

Task 6. Conduct Comprehensive Data Analysis

A comprehensive data analysis has been conducted. The analytical investigation included finite element modeling using ISLAB2000 for rigid pavements and MnLAYER for flexible pavements. Additional tire footprint measurements have been conducted in the last quarter, but due to scheduling problems and equipment malfunction the work could not be completed as planned. The utmost efforts will be made to complete the task in April-May of 2011.

Task 7. Damage Analysis Model

A computer program TONN2010 was modified to account for a non-standard tire footprint. The MEPDG concrete cracking model was adopted for analysis of the effect of heavy agricultural equipment.

Task 8. Prepare Draft Final Report

A significant portion of the efforts has been documented.

Anticipated work next quarter:

The research team will finalize task 6, 7, and 8 reports.

Significant Results:

Circumstance 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).