

TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Date: *January 25, 2013*

Lead Agency: *Montana 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 #: <i>TPF-5(251)</i> | Transportation Pooled Fund Program – Report Period: <input 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 checked="" type="checkbox"/> Quarter 4 (October 1 – December 31) | |
| Project Title: <i>Relative Operational Performance of Geosynthetics Used as Subgrade Stabilization</i> | | |
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| Lead Agency Project ID: <i>MDT Project #7712</i> | Other Project ID: <i>MSU/OSP: 4W3850</i> | Project Start Date: <i>December 1, 2011</i> |
| Original Project End Date: <i>November 30, 2013</i> | Current Project End Date: <i>November 30, 2013</i> | Number of Extensions: <i>0</i> |

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 | Percentage of Work Completed to Date |
|----------------------|--------------------------------|--------------------------------------|
| <i>\$581,726</i> | <i>\$385,860</i> | <i>55%</i> |

Quarterly Project Statistics:

| Total Project Percentage This Quarter | Total Amount of Funds Expended This Quarter | Total Percentage of Time Used to Date |
|---------------------------------------|---|---------------------------------------|
| <i>18%</i> | <i>\$107,361</i> | <i>54%</i> |

Project Description:

State departments of transportation (DOTs) routinely use geosynthetics for subgrade stabilization. This construction practice involves placing an appropriately specified geosynthetic on a weak subgrade prior to placement of roadway subbase. The geosynthetic provides stabilization of the subgrade by increasing the load-carrying capacity of the system and maintaining separation between the soft subgrade and subbase materials. Subgrade stabilization allows for a firm construction platform to be built with less aggregate and less construction time as compared to construction without the stabilization geosynthetic. There is a general consensus concerning the effectiveness of geosynthetics in this application; however, there is a lack of understanding and agreement on the material's properties needed for performance. Those properties should be specified in order to ensure its beneficial use and to allow a broad range of products to be considered. In order to provide for the most economical geosynthetic selection while minimizing conflicts and promoting competitiveness, MDT and other states are conducting a study to examine the performance of various geosynthetics for subgrade stabilization. The aim of the study is to relate this performance to material properties that can be incorporated into standard specifications to allow for broad and economical use of geosynthetic products for a specific application.

Progress this quarter:

Task 1 – Material Characterization

- *made up samples and completed approximately 20 percent of cyclic pullout tests*
- *completed approximately 75 percent of wide-width and cyclic tension tests*

Task 2 – Setup Monitoring Equipment – COMPLETED

- *all monitoring equipment was dismantled after trafficking*

Task 3 – Planning and Construction – COMPLETED

Task 4 – Install Instrumentation – COMPLETED

- *pore-pressure sensors were removed on October 23 to avoid freezing the sensors*
- *LVDTs were dismantled after trafficking*

Task 5 – Trafficking and Data Collection – COMPLETED

- *trafficking ended on November 7 after 740 truck passes*
- *final rut measurements were made on November 19*

Task 6 – Forensic Investigations

- *preliminary forensic investigations were conducted on November 19-21 to investigate potential reasons for significant differences in rut within a particular test section*
- *final forensics work will resume after spring thaw*

Task 7 – Data Analysis

- *preliminary analyses have begun of subgrade strength data, base course strength data and rut data*
- *organization and analyses have begun of pore-water pressure, displacement, strain and rut data*

Task 8 – Reporting

- *Progress Report #4 was written*
- *A memorandum was written to summarize construction and monitoring activities*
- *Work began on Task Report 2 – Summary of Construction, Trafficking and Monitoring*

Anticipated work next quarter:

Task 1 – Material Characterization

- *finish wide-width tension and cyclic tension tests on geosynthetics*
- *continue cyclic pullout tests on geosynthetics*
- *begin aperture stability modulus tests on geosynthetics*
- *begin junction strength tests on geosynthetics*

Task 2 – Setup Monitoring Equipment – COMPLETED

Task 3 – Planning and Construction – COMPLETED

Task 4 – Install Instrumentation – COMPLETED

Task 5 – Trafficking and Data Collection – COMPLETED

Task 6 – Forensic Investigations

- *work on this task will resume in late spring / early summer*

Task 7 – Data Analysis

- *finish analysis of subgrade and base course material properties using vane shear, LWD, DCP, in-field CBR, and nuclear density measurements*
- *continue analysis of pore-water pressure, displacement, strain, and rut data*

Task 8 – Reporting

- *submit Task Report #2*
- *submit Progress Report #5*

Significant Results:

There are no significant results to be presented at this time.

Circumstances Affecting Project or Budget:

Winter weather prevented full forensic investigations after trafficking. Remaining forensic work is scheduled to resume in late spring / early summer.

Potential Implementation:

It is anticipated that the information from this project will be useful to departments of transportation seeking to improve their specification of and use of geosynthetics for subgrade stabilization.