# TRANSPORTATION POOLED FUND PROGRAM
# QUARTERLY PROGRESS REPORT

Lead Agency (FHWA or State DOT): Louisiana Transportation Research Center (LTRC)

**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 #** *(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)* TPF-5(242) | | **Transportation Pooled Fund Program - Report Period:** ☐ Quarter 1 (January 1 – March 31) ☑ Quarter 2 (April 1 – June 30) ☐ Quarter 3 (July 1 – September 30) ☐ Quarter 4 (October 1 – December 31) |
|---|---|---|
| **Project Title:** Traffic and Data Preparation for AASHTO MEPDG Analysis and Design | | |
| **Name of Project Manager(s):** Doc Zhang | **Phone Number:** 225-767-9162 | **E-Mail** Doc.Zhang@LA.GOV |
| **Lead Agency Project ID:** | **Other Project ID (i.e., contract #):** | **Project Start Date:** Sept 1 2011 |
| **Original Project End Date:** Aug 31 2014 | **Current Project End Date:** Aug 31 2014 | **Number of Extensions:** 0 |

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 |
|---|---|---|
| $683,334 | About $425,000 | 61% |

***Quarterly*** Project Statistics:

| Total Project Expenses and Percentage This Quarter | Total Amount of Funds Expended This Quarter | Total Percentage of Time Used to Date |
|---|---|---|
| $55,000 and 8% | $55,000 | 61% |

**Project Description**:

Background:
The Mechanistic Empirical Pavement Design Guide (MEPDG) is a significant advancement in pavement design, but requires significantly more inputs from designers. Many data sets need to be pre-processed before their use in the MEPDG procedure, such as Weigh-In-Motion (WIM) traffic data.

Under contract with the Federal Highway Administration (FHWA) and the Office of Pavement Technology, and co-sponsored by the Arkansas Highway Department, the University of Arkansas recently developed a software program called Prep-ME with comprehensive database features to store and process climate, traffic and materials data and to: (1) identify all the required inputs and analysis parameters; (2) develop algorithms and procedures to locate the available data sets, pre-process raw data, check data quality, and import the traffic and other data sets to the designed database tables, including conducting quality checks on both weight and classification WIM data based on LTPP and FHWA methods; (3) implement database algorithms for uploading, data checking, and generating the required data files for the MEPDG software; and, (4) develop a user•]friendly software interface, Prep-ME, to generate the required input files for the MEPDG software.

Objectives:
The objective of the Prep-ME software is to assist state DOTs in the data preparation and improve the management and workflow of the MEPDG input data to make the MEPDG software more accessible. Additionally, it can be used as a critical tool for calibrating and implementing the MEPDG as well.

Scope of Work:
In order to make Prep-ME full production software assist states use the MEPDG, the software and services need to be

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

This quarter (April - June 2013) is the 8th quarter of the project. In this quarter the research team made progresses in the following activities:

1. Implement NCDOT cluster analysis algorithms in Prep-ME
2. Implement Michigan cluster analysis algorithms in Prep-ME
3. Implement TTC group analysis algorithms in Prep-ME
4. Develop GUI interfaces facilitating the implementation of these pre-designed procedures of NCDOT clustering and Michigan clustering methods.
5. Develop GUI interfaces for generating three level inputs of Pavement-ME

Specifically, the research team has developed C++ functions to generate multi-dimensional traffic results based on automatic and manual QC checking processes, such as sampling, replacement operations for incomplete traffic data.
In addition, the OSU team has developed C++ implementation of Ward-based hierarchical Agglomerative clustering algorithm, which is used in both NCDOT and MIDOT clustering analysis. As a result, Prep-ME can run clustering analysis independently without the needs of third party clustering software packages, such as Matlab, Microsoft Excel, Maple, SAS, or R et al.

By June 2013, the following eleven tasks agreed at the Detroit face-to-face meeting in September 2012have been completed:

Task 1: Implement NCDOT cluster analysis algorithms in Prep-ME

**Anticipated work next quarter**:

The following Tasks will be implemented during the next quarter, and an updated version of Prep-ME software will be released to the participating states in July 2013. It is planned that a Prep-ME face-to-face meeting to be held 30 days after the new release and a Prep-ME workshop at the 2014 TRB meeting on Thursday January 16, 2014. Specifically the following items will be conducted:

1: software testing, and bug fixing for the new developed functions and interfaces.
2: User's manual document preparation
3: Data flow dictionary document preparation for the maintenance of Prep-ME.

In addition, the research team will continue working on the following Tasks that were recommended from the Detroit face-to-face meeting:

Task 9: Include options on how to use incomplete data or short-term data that don't cover an entire year from January to December, such as using four seasons' data, factoring up monthly data, borrowing data from stations that have same TTC grouping, etc.;
Task 10 - Study LTPP tier 1 and LTPP tier 2 traffic default inputs from the LTPP pooled fund study (LTPP tier 2 is of higher quality).

The next quarterly report will identify more progresses on these activities.

**Significant Results:**

Currently, Prep-ME can generate all three level inputs for Pavement-ME software. Built upon the traffic pattern clustering research results of NCDOT and MIDOT, one united platform has been developed for the implement of both NCDOT and Michigan clustering methods. In addition, for those states that don't have on-site traffic clustering approaches, Truck Traffic Classification (TTC) based approach and simplified clustering approach are developed.

The new designed clustering interface will benefit each participating state the implementation of Pavement ME Design with generated traffic load spectra data based on available short term traffic data and local traffic knowledge.

As scheduled, a new version of Prep-ME will be delivered at the beginning of July 2013.

**Circumstance affecting project or budget. (Please 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).**

There is no circumstance affecting the project or budget at this time.

**Potential Implementation:**

No new information on implementation at this time