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 $270,000	40%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
$80,000 and 12%	$80,000	44%

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 (October - December 2012) is the 6th quarter of the project. In this quarter the research team made progresses in the following activities:

1. Improve computation efficiency of Prep-ME

This task is primarily to improve the speed of execution of the numerical engines in Prep-ME, and functions of the raw data import/update and user's data interpolation. The project team has investigated and implemented possible run time efficiencies that can be realized, such as storage procedure and multi-threading technique. The current Prep-ME differentiate WIM data in "direction of travel" and "lane of travel", while the previous Prep-ME doesn't. In other words, the current software process four times more data. Meanwhile, the current speed of processing the raw data is approximately two times faster than the previous edition. Therefore, it is estimated that the processing speed has been improved by approximately 10 times faster than these of the Prep-ME in its current form.

2. Completed Tasks

By December 2012, the following tasks in the original proposal have been completed and programmed in the interface of Prep-ME:

Task 1 - Make current features of Prep-ME software compatible with DARWin-ME
Task 4 - Accept quality-checked traffic data without processing
Task 5 - Provide three levels of traffic data input for DARWin-ME

Anticipated work next quarter:

After two days' face-to-face meeting of representatives from the participating states, FHWA, and the OSU team in September 5-6 2012 in Detroit, significant feedback was obtained from participants and the OSU research team is recommended to execute the activities as summarized in the following:

1. Implement NCDOT cluster analysis algorithms in Prep-ME;
2. Implement Michigan cluster analysis algorithms in Prep-ME;
3. Climate data: explore climate data for each state; identify the data gaps; implement a standard procedure to handle climate data; repair missing data and perform data checks;
4. Create log files for inventory of data importation and include the option to review traffic data for specific station with date range, such as days, weeks, months;
5. Develop import functionalities for short-term data and classification only data;
6. Generate a report documenting file names read into DARWin-ME, and DARWin-ME output files with Prep-ME traffic data in order to differentiate and reuse multiple run results;
7. Separate analysis on Directional and lane data using TMAS 2.0 rules for daily checks;
8. Differentiate classification and weight stations that are used for design on Google map;
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.;
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);
11. Expand the WIM station's identifier so that it accepts not only numeric but also other formats;
12. Separate climate module and traffic module, including data import and interpolation;
13. Make Prep-ME compatible with the 2012 TMG traffic data and apply TMAS checks after the official 2012 TMG is finalized;
14. Propose a plan/preliminary implementation in the webinar in the fall for the three new tasks, soil map;
15. Use different QC's algorithms for Classification data, the current one based on standard deviation has a limitation and

Significant Results:

By December 2012, the OSU research team has investigated and implemented run time efficiency algorithms that can be realized to improve the speed of execution of the numerical engines in Prep-ME. The GUI has also been redesigned and this effort will continue during the execution of the project. The current Prep-ME differentiate WIM data in "direction of travel" and "lane of travel". Task 1, Task 4, Task 5, Task 8 in the original proposal have been completed and programmed in the interface of Prep-ME. The research team has also made substantial progress in Task 2, Task 3, Task 6 in the original proposal. In addition, the research team has also started working on several Tasks that were recommended from the Detroit face-to-face meeting, including Task 5, Task 7, Task 9, Task 11. It is anticipated that a new version of Prep-ME will be delivered in the mid 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