KANSAS DOT RESEARCH PROJECTS
QUARTERLY PROGRESS REPORT

Lead Agency (University or Contractor):_____Kansas 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.

KDOT Project Number RE-0617-01	**Transportation Pooled Fund Program - Report Period:** ☐Quarter 5 (January 1 – March 31, 2014) ☐Quarter 6 (April 1 – June 30, 2014) ☐Quarter 7 (July 1 – September 30, 2014) XQuarter 8 (October 4 – December 31,2014)
Project Title: Real-Time Quality Control Monitoring and Characterization of Aggregate Materials in Highway Construction using Laser Induced Breakdown Spectroscopy	
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Lead Agency Project ID: RE-0617-01	**Other Project ID (i.e., contract**	**Project Start Date:** TBD
Original Project End Date: **TBD**	**Current Project End Date:** **TBD**	**Number of Extensions:** 0

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
$975,000	$426,089.82	43.7%

Quarterly Project Statistics:

Total Project Expenses This Quarter	Total Amount of Funds Expended This Quarter	Percentage of Work Complete This Quarter
$975,000	$76,170.27	7.8%

Project Description:

The primary objectives of this research effort is to calibrate laser-spectral models to develop the means to monitor aggregate materials from participating State agencies, and to demonstrate the use of the technology in actual field applications. The overall objective is to transition the technology from a lab-based application to a field based system. Testing of aggregates and the calibration models developed in the NCHRP 150 research effort were accomplished using a laboratory-based laser-optical system. The proposed pooled fund work plan is designed to transition the technology from the laboratory to the field through the calibration, deployment and demonstration of the technology at selected field demonstration site(s). As part of the NCHRP 168 project, a field prototype sampling and laser targeting system field prototype, referred to as the SLT system (Sampling and Laser Targeting System), is under development for use in the pooled funding effort. The SLT system is a bulk sampling and laser-targeting system that is designed to analyze a diverted portion of the bulk material by passing target aggregate material passed a laser that is strategically located to provide for continuous or semi-continuous monitoring of the bulk aggregate stream. Diversion of samples of the bulk material into the SLT system is designed to remove the aggregate from the bulk stream during material transport, such as conveying. This material diversion provides the means to minimize interferences that would be encountered in an in-line monitoring system, without diminishing the effectiveness of the laser monitoring system to obtain large quantities of data necessary to properly characterize the targeted material. It also provides the means to ensure safe operation of the laser by enclosing the entire system in a separate sealed housing disconnected from the main bulk material conveying system, thereby ensuring a contained and safe operation. The SLT can be deployed in a laboratory environment as well where buckets of samples are periodically introduced for analysis or in a continuous or semi-continuous field operation where materials are diverted from a conveying operation to the SLT for analysis.

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

During this period a standard titanium sample was selected to normalize intensity data between samples tested on different days; and a new standard sample laser targeting procedure was incorporated into the SLT operation. The first round of samples were received from all States and laser-scanned, Initial engineering property model calibrations were undertaken on samples received. Software modifications are in progress to enable automatic processing of the data. A Review Meeting of the Research Team and participating group (NY, OK, PA, OH and Ok) was scheduled for March 2015 at NMSU. Plans were made with NY, PA and OH to receive additional samples for testing. Additional plans are being made to take the SLT off line for approximately 30 days during this coming quarter or the next quarter to make several modifications.

Anticipated work next quarter:

New samples will be received from NY, OH and PA for testing. The SLT may be taken off line at the end of the next quarter for system modifications to improve access to equipment for maintenance purposes and to install additional sensors to facilitate operator control of the system. The second technical review meeting is scheduled for March 24, 2015 in Las Cruces, New Mexico at New Mexico State University.

Significant Results:

Calibration data generated to date suggest that the models can predict engineering properties. Not all properties are modeled equally. Three significant issues are at play: 1) Laser generated intensities require normalization, and 2) Additional sample analyses are needed to increase the sample population and 3) Capability of the spectra to be resolved sufficiently to differentiate samples with different properties.

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, with recommended solutions to those problems).

At the present time the project is approximately 6 months behind schedule due to equipment down time and delays in receiving samples. Further delays are anticipated since the research team will be expanding the sampling and testing effort over the next several quarters.