Arkansas State Highway and Transportation Department
Transportation Research Committee

RESEARCH PROBLEM STATEMENT

DATE: 08/27/2010 **PROJECT AREA:** Planning

TITLE: Weigh-in-Motion (WIM) Sensor Evaluation

PROBLEM STATEMENT:

AHTD is a leader in deploying Weigh-in-Motion sensors in its pavement network. Due to lower cost, piezoelectric sensors are the dominant WIM type used in Arkansas and many other highway agencies. WIM data are critical in several areas of transportation engineering, from planning, operation, law enforcement, and pavement design. The recent reliance on WIM data for the new Mechanistic- Empirical Pavement Design Guide (MEPDG) calls for quality control of traffic data due to errors in the original WIM data sets.

For example, piezoelectric based WIM sensors are susceptible to temperature variations, and unstable due to other environmental factors. As weight data of truck streams are a driving parameter in the new MEPDG for designing new pavements and overlays, it is necessary to re-examine the cost-effectiveness of piezoelectric based WIM sensors, as maintenance and calibration of the sensors may drastically increase the life-cycle cost of the WIM stations. In addition, a large portion of traffic data from piezoelectric based WIM sensors may not be repairable, resulting in loss of critically needed data. The proposed research asks a thorough evaluation from both performance and cost perspectives of several types of sensors used for WIM, and implement test WIM sites with better technology in terms of precision and bias under all loading and environmental conditions.

OBJECTIVES:

The ultimate objective is to assess the performance and cost-effectiveness of several types of WIM sensors for both concrete and asphalt pavements. In particular, bending plate and quartz based WIM sensors along with the current piezoelectric sensors will be evaluated. Detailed objectives are (1) to establish performance measures for evaluating various WIM sensors, (2) to install several new WIM stations with different sensors, (3) to collect field data collection, and (4) to conduct statistical evaluation on precision and bias.

Form of Research Implementation:

Several WIM stations with non-piezoelectric sensors will be constructed in this research project. One-year long data collection on the sites is conducted to compare seasonal variations. Final report and recommendation will be delivered to AHTD.

Total Estimated Cost and Project Duration: **$** 300,000 **and** 27 **months.**

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ADVISORY COUNCIL RANKING	TRC RANKING	Statement Combined with Statement Number(s)
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