Arkansas State Highway and Transportation Department
Transportation Research Committee

RESEARCH PROBLEM STATEMENT

DATE: 08/27/2010 **PROJECT AREA:** Special Projects

TITLE: Development and Evaluation of a Bridge Weigh-In-Motion System

PROBLEM STATEMENT:

Bridge Weigh-In-Motion (B-WIM) systems have been developed in Europe during the past several years and show some promise and advantages compared to conventional WIM systems installed in pavements. These systems utilize sensors (extensometers or strain gages) that are either temporarily or permanently installed on the bridge superstructure, in conjunction with various statistical and numerical analysis methods to identify the axle configurations and axle weights of trucks that cross the instrumented bridge spans. In addition to being able to characterize the live loads on the structure, the sensor measurements can also be used to characterize the condition of the structure. Such systems can therefore provide traffic load data used for pavement design and management programs while also providing data that could enhance the operational and maintenance management of bridges. Measurements of the actual loads and the corresponding structural responses would enable reliable load ratings or remaining fatigue life assessments to be computed in near real-time, and any damage induced by permit or overweight trucks could be documented and used to recover the costs of repairs. B-WIM systems could be very useful for permit decisions and for managing bridges located on routes that are regularly subject to heavy truck loads.

OBJECTIVES:

The objective of this project is to develop a practical B-WIM system that could be used to identify axle loads and their weights while also characterizing the performance of the bridge on which it is installed. Since different bridge configurations would require different instrumentation schemes and data analysis procedures for B-WIM, the focus of this project would be initially limited to the design and evaluation of a B-WIM for a single bridge configuration (e.g. concrete deck on steel beams). The B-WIM system would first be designed and evaluated analytically, then deployed, calibrated and evaluated on a bridge using controlled truck loads.

Form of Research Implementation:

A final report documenting the design, installation, and operation of the B-WIM system, and the results of the system evaluation would be a deliverable of the project. The report would also make recommendations related to possible future system refinements and on the modifications envisioned for other structural configurations.

Total Estimated Cost and Project Duration: **$** 170,000 **and** 24 **months.**

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