Arkansas State Highway and Transportation Department
Transportation Research Committee

RESEARCH PROBLEM STATEMENT

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

TITLE: Reduction of Bridge Embankment Settlement Using Recycled Plastic Lightweight Backfill

PROBLEM STATEMENT:

Bridge embankment settlement results from consolidation of foundation soils caused by the surcharge of a bridge embankment. Typical embankment construction practices require extended construction times or construction staging to allow for the abutment to settle prior to the bridge/roadway being opened for service. This practice is intended to reduce the differential settlement between the bridge deck and bridge embankment. Unfortunately, problems associated with differential settlement still exist for many bridges on Arkansas roadways (interstates, primary, and secondary roads) even after allowing time for settlement and using bridge approach slabs.

Lightweight backfill may be used to reduce the time required for construction and to reduce the amount of differential settlement. Specifically, constructing the core of the embankment with bales of recycled plastic waste may be an efficient means of reducing cost associated with embankment construction (earthwork, backfill), delays associated with surcharge and staging, and reuse of a product that may be considered a waste material.

OBJECTIVES:

The primary objective of this research is to evaluate the use of bales of recycled plastic waste as lightweight fill for bridge embankments. Specific objectives include: 1) conduct a thorough literature review of the available literature, 2) construct two embankments (one constructed using traditional construction techniques and backfill materials, the other constructed using bales of recycled plastic waste), 3) compare the settlement associated with each embankment, and 4) assess the engineering, economic, and environmental advantages of using bales of recycled waste as lightweight backfill in bridge embankments.

Form of Research Implementation:

This research will provide recommendations to AHTD regarding the feasibility of incorporating recycled plastic as lightweight backfill in bridge embankments. If the use of these bails presents economic and environmental benefits, design guidelines will be produced to provide AHTD with guidance for implementation

Total Estimated Cost and Project Duration: **$** 275,000 **and** 36 **months.**

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