Statement No. 9

Arkansas Department of Transportation

Transportation Research Committee

RESEARCH PROBLEM STATEMENT

DATE: 08/24/2017 | **PROJECT AREA:** Design

TITLE: Life Cycle Cost Analysis of Alternative Culvert Designs

PROBLEM STATEMENT:

Culverts are an important part of transportation systems, and the most common types include pipe, arch, box, and bridge culverts with single or multiple barrels. Among these designs, multiple-barrel culverts typically have the same dimensions due to the ease of design and installation. However, many existing culvert designs fail to take sediment accumulation into account, which can be a major maintenance problem throughout the design life of a culvert. The objective of this study is to perform life cycle cost analyses (LCCAs) on alternative culvert designs with an emphasis on sediment control and prevention. The alternative designs include bottomless culverts, and multiple-barrel culverts with different dimensions, etc. By comparing the culvert performance and cost of design, in addition to installation and maintenance requirements, this study would benefit the Arkansas Department of Transportation (ArDOT) by identifying the most suitable culvert designs for future installations.

OBJECTIVES:

The goal of this project is to identify the most suitable culvert type by performing LCCA on alternative culvert designs. The objectives include: (1) selecting design alternatives in consultation with ArDOT, (2) comparing the culvert performance and sediment accumulation using numerical modeling software, (3) performing LCCA on selected design alternatives; and (4) preparing an implementation manual for the best performing design(s).

FORM OF RESEARCH IMPLEMENTATION:

The best performing culvert design alternative(s) will be identified, and an implementation manual will be prepared and presented to ArDOT personnel.

Estimated Project Duration: 24 **months**

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Standing Subcommittee Ranking	Advisory Council Ranking	Statement Combined with Statement Number(s)
4 / 5	14 / 44	