



# Transportation Consortium of South Central States

## Key Points

**Project Number:**

18GTASU01

**Start Date:**

03/15/2018

**End Date:**

09/15/2019

**Principal Investigator(s):**

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**Lead Institution:**

Arkansas State University

**Funds Requested to UTC:**

\$50,000

**Funding Source(s):**

Tran-SET

Arkansas State University

**Total Project Cost:**

\$100,271

## Development of Metals Corrosion Maps of Arkansas and Maintenance of Cross-Drains

### Brief Project Description

The goal of this study is to develop such user-friendly corrosion map for all Arkansas DOT districts by analyzing relevant historical soil, materials and environmental data. Required mathematical models followed by user-friendly maps will be developed to accomplish the goals of this study. This study will also look into the maintenance prospective of cross-drains to help prevent future damage to roadway.

### Problem Statement

Cross-drains are considered one of ARDOT's most valuable assets. Metal culverts or pipes used in cross-drains along or across the Arkansas highway system can corrode over time. The rate of metal corrosion varies around the ARDOT districts and it depends on various material properties and environmental conditions, which include soil type, ground water table, rainfall, acidity level of soils, etc. Catastrophic incidents such as a complete wash out of metal culverts along with roadway can be prevented if proper metals can be selected during the construction project. A user-friendly corrosion map can help to reduce such catastrophic damage and save human life and properties.

### Objectives

The main objective of this study is to develop a corrosion map of Arkansas so that appropriate metal pipes can be selected for cross-drains. Specific objectives are: (1) Analyze soils, materials and environmental data from historical and new construction projects; (2) Develop a user-friendly corrosion map for Arkansas; (3) Conduct life cycle cost analysis of different metal pipes; and (4) Suggest cost-effective maintenance options of cross-drains to lengthen their service lives.

### Intended Implementation of Research

#### *Workforce Development*

The study will help the research team to recruit and train graduate and undergraduate students in research. In addition, technical articles and posters will be presented at national and local conferences and symposia such as Create@ASATE in Jonesboro, AR and a presentation will be made



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at the A-State Chapter of the ASCE. A webinar will be organized to broadcast the findings of this study with a broad audience that will include DOT engineers, asphalt professionals and researchers around region.

## **Anticipated Impacts/Benefits of Implementation**

A potential implementation of this study is to provide recommendations for possible changes of the Arkansas Highway and Transportation Division (AHTD) Specifications Division 600 (SECTION 606 PIPE CULVERTS> 606.02 Materials). Implementing the outcome of this study will be significant cost savings for ARDOT by selecting proper metals and taking necessary measures to enhance existing structures' service life. It will also help ARDOT to avoid catastrophic damage due to corrosive failure of metal pipes used in cross-drains.

### **Weblinks:**

<http://transet.lsu.edu/research/research-in-progress/>

<https://rip.trb.org/View/1505428>