

**RESEARCH PROBLEM STATEMENT**

<b>DATE:</b> 9/6/2019	<b>PROJECT AREA:</b> Maintenance
<b>TITLE:</b> Metal Culvert Corrosion Risk and Life Cycle Cost Maps	
<b>PROBLEM STATEMENT:</b>	
<p>Metal culverts or pipes used 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. User-friendly corrosion risk maps and life cycle cost analysis will help to reduce such catastrophic damage and save human life and properties. Also, selecting less expensive metals in less corrosive areas can be cost effective to the ArDOT. Since different metals corrode at different rates even under the same environmental conditions, this could lead to us selecting more appropriate materials for a longer life expectancy. Louisiana has done similar work and completely banned metal pipes in District 2 (New Orleans). As part of a TranSET project, only District 10 soils have been tested, but soils throughout the state need to be tested to develop better models and obtain more accurate findings.</p>	
<b>OBJECTIVES:</b>	
<p>The main objective of the proposed study is to develop corrosion maps 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.</p>	
<b>FORM OF RESEARCH IMPLEMENTATION AND RETURN ON INVESTMENT:</b>	
<p>Recommendations for possible changes of ArDOT Specifications Division 600 (SCETION 606 PIPE CULVERTS&gt; 606.02 Materials). Implementing the outcome of this project 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.</p>	
<b>Estimated Project Duration:</b> 24 Months	
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Standing Subcommittee  
Ranking

Advisory Council  
Ranking

Statement Combined with  
Statement Number(s)