

**Arkansas State Highway and Transportation Department
Transportation Research Committee**

RESEARCH PROBLEM STATEMENT

DATE: 09/12/2016	PROJECT AREA: Construction
TITLE: Cost-Benefit Analysis of Ground Improvement Techniques	
PROBLEM STATEMENT:	
<p>There are various treatment techniques available to improve the conditions of poor or unstable soils; however, it is often difficult to determine the most cost effective option for a given site. Typical ground improvement techniques include: soil mixing, vibro or stone columns, rammed aggregate piers (RAP), and grouting. These methods each have advantages and disadvantages and were developed as cheaper alternatives to deep foundations and cut and replace operations; however, constructability and site applicability can make implementation difficult and even potentially more expensive. Many researchers have investigated the effects of different soil improvement techniques on the resulting performance; however, very few have considered the cost of the foundation systems (including constructability) as a governing factor. Because the economic feasibility of ground improvement methods has been shown to be highly dependent on the geologic conditions at a site, there is a need for the decision making process to include site-specific analysis of foundation performance, as well as the overall projected cost. Combining the site-specific performance data with a cost-benefit analysis could streamline the decision making process and ultimately save AHTD a great deal of money.</p>	
OBJECTIVES:	
<p>The main objective of this study is to develop a cost-benefit analysis tool and recommendations that AHTD can use to determine the most cost-effective ground improvement technique for various soil conditions encountered across the state. Determining the performance limits of each ground improvement method for typical soil conditions throughout Arkansas will aid in providing the benefit metric. Based on the resulting design for each improvement method, the cost, as determined from the materials required and all aspects of the construction, will be assessed. Combining this information will allow for site-specific recommendations to be made.</p>	
FORM OF RESEARCH IMPLEMENTATION:	
<p>The research conducted in the project will immediately and directly impact ground improvement decisions at AHTD. The cost-benefit analysis tool will help guide the site-specific foundation recommendations made. Training and procedures for conducting these analyses will be provided upon completion of the work.</p>	
REVIEWER: Chris Dailey	Estimated Project Duration: 24
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Standing Subcommittee
Ranking

0

Advisory Council
Ranking

15

Statement Combined with
Statement Number(s)
