

**Arkansas Department of Transportation****Transportation Research Committee****RESEARCH PROBLEM STATEMENT****DATE:** 08/28/2017**PROJECT AREA:** Materials & Tests (Geotechnical)**TITLE:** Developing Subgrade Stabilization and Improvement Procedures in Arkansas Using Fly Ash**PROBLEM STATEMENT:**

One of the major causes of poor highway conditions in Arkansas and elsewhere in the United States is the improper placement of subgrade soils. Poor subgrade requires stabilization to provide a stable platform during earthwork construction. Stabilization methods include mixing with cement, fly ash and lime. Fly ash typically contains at least 70% glassy material with particle sizes varying from 1µm to greater than 1 mm. Class C fly ash (CFA) is an abundant, industrial byproduct, self-cementing fly ash, which contains enough available calcium to react with soil in the presence of water. It was the objective of Project TRC 1308 to establish guidelines for subgrade stabilization using lime, cement and fly ash. The project included performing soil stabilization at three construction sites. Stabilization was performed mainly using lime and cement; with CFA-based stabilization attempted only twice and yielded less than desirable results. TRC 1308 final report included clear recommendations for stabilization procedures using lime and cement recommended further investigation / trial mixes if CFA is to be utilized. It is important to note that CFA has been used successfully for soil modification / stabilization at other areas of the United States and the world.

**OBJECTIVES:**

The objective of this proposed research project is to develop subgrade stabilization procedures for Arkansas soil using CFA. The work will be accomplished through a comprehensive review of available literature and past experience of other states, extensive laboratory testing using equipment already available at AHTD laboratory or purchased using TRC 1308 funds to establish proper mixing procedures and dosages to achieve predetermined improvement level in soil consistency and strength. Field stabilization will then be performed on soil requiring stabilization at actual construction project. Final recommendations will be made based on the results of the laboratory and field testing.

**FORM OF RESEARCH IMPLEMENTATION:**

A project report will be issued to present the procedures and recommendations. A comprehensive soil stabilization procedure in conjunction with the previous recommendations made in the TRC 1308 report. A one-day workshop will be planned with AHTD geotechnical and construction personnel to present the results and address inquires or concerns.

**Estimated Project Duration:** 18 months**PREPARED BY:** Ashraf S. Elsayed, Ph.D., P.E., D.GE**AGENCY:** Arkansas State University**PHONE:** (870) 972-2088**REVIEWER:** Joseph JaboStanding Subcommittee  
Ranking12 / 12Advisory Council  
Ranking38 / 44Statement Combined with  
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