**Research Project**

**95-3GT**

**Capsule**

*Technology Transfer Program*

LTRC

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# In-place Cement Stabilized Base Reconstruction Techniques

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*Principal Investigator:*
*Kevin Gaspard, P.E.*
*LTRC*

*Co-principal Investigator:*
*Craig Duos, P.E.*
*LTRC*

*LTRC Contacts:*
*Administrative:*
*Harold "Skip" Paul, P.E.*
*Assoc. Director, Research*
*(225)767-9102*

*Technical:*
*Mark Morvant, P.E.*
*Research Manager*
*(225)767-9124*

LTRC

*Louisiana Transportation Research Center*

*Sponsored jointly by the Louisiana Department of Transportation and Development and Louisiana State University*

*4101 Gourrier Avenue*
*Baton Rouge, LA 70808-4443*

## Problem

The Louisiana Department of Transportation and Development (DOTD) is undergoing a major budget shift from construction of new alignments to maintaining the existing infrastructure. A large percentage of DOTD's current construction budget is targeted for rehabilitation of existing asphalt surfaced roadways built on soil cement bases.

Existing soil cement base courses are frequently reconditioned with additional cement to save money. However, there are also problems associated with re-stabilizing soil cement bases, including but not limited to excessive shrinkage cracks (transverse and longitudinal) and premature base failures. This study will focus on early base failures and shrinkage cracks and identifying factors which contribute to these types of failure.

Premature base failures may be attributed to weak saturated subgrades and/or shrinkage cracks which reflect through the wearing course providing a path for water to infiltrate the base. This water infiltration could lead to stripping of asphalt and eventual formation of potholes. Shrinkage cracks may be related to factors such as

*Soil cement project on La. 870 in Franklin Parish.*

cement content, moisture and density control, inadequate curing period, and maintaining traffic on the newly constructed bases.

The standard soil cement base course design in Louisiana has been eight and a half inches thick with a minimum compressive strength of 300 psi. Relatively high cement to soil ratios are required due to poor soil conditions throughout the state. The high cement content can be a contributing factor in the propagation of shrinkage cracks.

## Objectives

The purpose of this research is to study mechanisms that may reduce shrinkage cracking in soil cement and thus improve the longevity of the pavement structure.

This research program will include investigating the critical role of moisture content during the hydration and curing process; what effects, if any, density control has on shrinkage cracks; what strength requirements and structural coefficients are derived from decreased cement content and increased thickness; and what benefits can be achieved from fiber reinforced soil cement.

## Description

DOTD is constantly searching for ways to improve the pavement life of its roadways. Reducing crack development in asphalt pavements using soil cement bases would immediately impact DOTD's maintenance and construction budget.

This project will provide DOTD with a comparative study documenting the effects that different soil cement parameters and additives have on reducing shrinkage cracks. Also, this project will evaluate the adequacy of DOTD's standard testing and design procedures.

It will provide insight into alternative base thicknesses with differing cement percentages, new or different methods to control density, the importance of adequate moisture control during construction, constructability of bases with fiber reinforcements, and whether fiber reinforcements aid in reducing shrinkage or increase shear and compressive strength of soil cement.

## Implementation Potential

The results obtained from this research will either verify the adequacy of existing moisture-density control procedures or recommend a more effective method to determine the optimum moisture content and maximum density of soil cement under field conditions.

Additionally, the characteristics of fiber-reinforced soil cement such as constructability, compressive strength, shrinkage crack influence, and cost effectiveness will be gauged and described.

These results will be implemented by modifying existing moisture/density test procedures and specifications, QPL product listing, and soil cement mix design procedures.