



# Transportation Consortium of South Central States

## Key Points

**Project Number:**

18BLSU16

**Start Date:**

05/15/2018

**End Date:**

05/14/2020

**Principal Investigator(s):**

*Mostafa Elseifi*

Louisiana State University

elseifi@lsu.edu

**Lead Institution:**

Louisiana State University

**Funds Requested to UTC:**

\$0

**Funding Source(s):**

Louisiana Transportation

Research Center

**Total Project Cost:**

\$113,000

## Evaluation of Asphalt Rubber and Reclaimed Tire Rubber in Chip Seal Applications

### Brief Project Description

The aim of this study is to improve the durability and to extend the life of chip seal applications using rubber-modified emulsion and reclaimed rubber tires in the aggregate layer. To achieve this aim, the study will review state practices in the use and construction of rubberized chip seal including both asphalt rubber, rubber-modified emulsion, and reclaimed rubber tires in the aggregate layer. Based on this review, job mix formula will be developed for rubberized chip seal and will be evaluated in the laboratory. Crumb rubber will be used as a binder modifier as well as part of the aggregate stone. Construction, short-term field performance, and cost-benefit analysis of this new class of asphalt surface treatment will be evaluated to facilitate implementation in pavement preservation activities.

### Problem Statement

In recent years, pavement maintenance and rehabilitation activities have increased as compared to design and construction of new pavements. The Louisiana Department of Transportation and Development (DOTD) pavement preservation program performs timely maintenance activities in order to arrest initial deterioration, reduce deterioration rate, and defer costly rehabilitation activities. Historically, the most common preventive maintenance activities (thin overlays and resurfacing) are applied to pavements exhibiting age-related distresses. If structural capacity of the existing pavement is adequate to support future traffic loads, surface treatments (e.g., chip seals) are used due to low initial cost and convenient construction process.

Chip seals, specified as Asphalt Surface Treatment (AST) are carried out by spraying asphalt emulsion or hot bitumen on an existing roadway surface, followed by the application of a crushed aggregate layer. Chip seals are typically favored on low-traffic roadways for providing reduced surface permeability/raveling/oxidation and improved skid resistance. Bleeding and early loss of aggregate are common distresses while roughness and increased traffic noise are functional limitations of this treatment method.

Asphalt rubber chip seals have been used in other states (e.g., Arizona and California) with advantages of improved durability, crack resistance, and



# Transportation Consortium of South Central States

reduced traffic noise. However, these benefits have not been validated for operating conditions in the South Central U.S.

## Objectives

The objective of this study is to improve the durability and to extend the life of AST using rubber-modified asphalt emulsion and using reclaimed rubber in the aggregate layer. Construction methodology, short-term field performance, and cost-benefit analysis will be evaluated.

## Intended Implementation of Research

Research results will be implemented in the course of the project by a number of districts in Louisiana. As part of the project, the research team will develop an implementation plan that presents a strategy to introduce the results into the state-of-the-practice, pavement preservation, and specifications of the Department. This research will impact LaDOTD, highway contractors, transportation and civil engineers, and Louisianans in general.

## Anticipated Impacts/Benefits of Implementation

The implementation of this research will enhance the performance of chip seal in pavement preservation activities and will improve the rideability of this surface treatment. The results of this research will be used to implement and to optimize the use of rubberized chip seal in Louisiana and to reduce costs.

## Weblinks:

- [Tran-SET's website \(http://transet.lsu.edu/research-in-progress/\)](http://transet.lsu.edu/research-in-progress/)
- [TRB's Research in Progress \(RIP\) database \(https://rip.trb.org/View/1521615\)](https://rip.trb.org/View/1521615)