



RESEARCH PROJECT CAPSULE [19-1GT]

August 2019

TECHNOLOGY TRANSFER PROGRAM

Maintenance of Roadway Edge Drop-Off Utilizing Readily Available Materials

JUST THE FACTS:

Start Date:

February 1, 2019

Duration:

15 months

End Date:

April 30, 2020

Funding:

SPR: Pooled Fund: TT-Fed

Principal Investigator:

Gavin P. Gautreau, P.E.
Senior Geotechnical Research Engineer
Louisiana Transportation Research Center

Administrative Contact:

Tyson Rupnow, Ph.D., P.E.
Associate Director, Research
225-767-9124

Technical Contact:

Zhongjie "Doc" Zhang, Ph.D., P.E.
Pavement & Geotech Research Administrator
225-767-9162

Louisiana Transportation
Research Center
4101 Gourrier Ave
Baton Rouge, LA 70808

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

POINTS OF INTEREST:

Problem Addressed / Objective of
Research / Methodology Used /
Implementation Potential

WWW.LTRC.LSU.EDU

PROBLEM

The Louisiana Department of Transportation and Development (DOTD) District 05 (in the northeastern corner of the state) spent 55,000 man-hours and over \$1 million in 2016 attempting to maintain roadway edges along non-paved shoulders.

Non-paved shoulders typically consist of a soil and aggregate mixture. This material is routinely disturbed and lost, primarily at the edge of the paved roadway. The problem is more prevalent on narrow winding roadways where wheel paths meander near the roadway edge, and wheels often disturb the material and create a drop-off (edge rut). Edge drop-offs can also be created by overlay operations.

The Federal Highway Administration (FHWA) has an Every Day Counts (EDC) program that "...identifies and rapidly deploys proven, yet underutilized innovations to shorten the project delivery process, enhance roadway safety, reduce traffic congestion, and integrate automation." One innovation deployed through EDC-1 is the Safety Edge®. Safety Edge® is a process that creates a smoother road edge that is friendlier to cars that stray from the road. Figure 1 shows an extreme example of an edge drop-off, which appears to have been created and/or exacerbated by an overlay. DOTD has started utilizing the Safety Edge® to reduce the severity of new overlays.

The graded shoulder materials adjacent to overlays or existing road edges should be stable, durable, and meet the road edge; see Figure 2. Vehicles, time, and erosion wear on the shoulders, resulting in the need for maintenance operations. Cost and space issues limit the availability of asphalt paved shoulders on rural low-volume roads. The methods used to maintain these non-paved shoulders statewide varies and performance has been undocumented.

Reclaimed asphalt pavement (RAP) is readily available and used in many areas of the state for shoulder repair. Some parish maintenance units use 100% RAP while others use a blended mixture of RAP and native soils.



Sharp, steep pavement edge drop-offs can contribute to crashes.

Figure 1
Extreme edge drop-off

(Source: <https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/pdf/brochure.pdf>)

OBJECTIVE

This research will evaluate the effectiveness of different strategies like RAP, hydrated fly ash (HFA), and other alternatives as possible shoulder materials for reducing and potentially eliminating edge drop-off safety issues within the state. This research will evaluate the application and performance of different alternatives and develop a logical method to address problematic shoulder locations.

METHODOLOGY

The research team will first investigate previous and ongoing work nationwide regarding edge drop-off issues. A state-wide survey will also be prepared and distributed to DOTD districts to determine current practices and remediation methods.

The research team will then develop a test matrix to evaluate options, including laboratory testing and possible field test sections. The varied options will be evaluated for performance and cost-effectiveness. The research team will make recommendations based on its analysis of research findings.

IMPLEMENTATION POTENTIAL

More stable shoulders (with no edge drop-off) creates a safer driving environment. Utilizing best practices with readily available materials and/or asphalt edge modifications will reduce maintenance costs and improve safety.

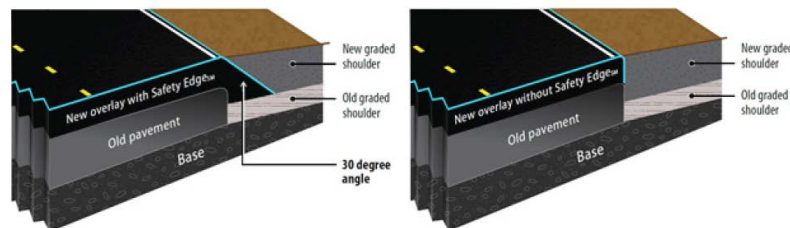


Figure 1. Graphic. SafetyEdgeSM versus conventional paved edge immediately after repaving.

(Left panel: SafetyEdgeSM immediately after paving with backfill material graded flush with paved surface. Right panel: Conventional pavement overlay without the SafetyEdgeSM with backfill material graded flush with the paved surface)

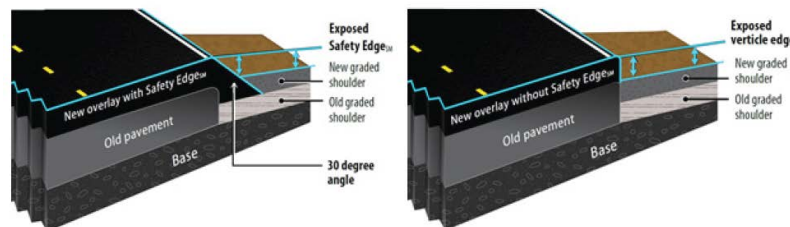


Figure 2. Graphic. SafetyEdgeSM versus conventional paved edge after backfill material settles or erodes.

(Left panel: SafetyEdgeSM is exposed to traffic after backfill material settles or erodes. Right panel: Conventional pavement overlay without the SafetyEdgeSM after backfill material settles or erodes)

Figure 2

SafetyEdgeSM and adjacent graded shoulder

(Source: https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/pdf/safety_edge_techbrief.pdf)