

TxDOT Innovations and Technology Deployment Briefs

Slope Repair and Maintenance Management System (SRMMS)



PROBLEM

Owing to soil properties and weather, slope failure is a consistent and recurring issue in the Paris District. Slope failure can be disastrous to the roadway infrastructure, the environment, and the traveling public, depending on the location.

SOLUTION

To address this issue, the district worked with The University of Texas at Arlington (UTA) to test an application for identifying potential slope failure locations and possible solutions. Data related to previous repairs and slope stability variables including soil properties, slopes adjacent to roadways (fill, cut, and natural), rainfall, and vegetation coverage was gathered and compiled into a visual application available through the UTA website, providing possible solutions and cost estimates.

BENEFITS

Using data to determine the most effective slope protection saves TxDOT construction and maintenance costs. The goal of the Slope Repair and Maintenance Management System (SRMMS) is to make a repair once and avoid occurrences of multiple failures in the same location. A historical record of where failures occur, and which solutions are optimal, will benefit future generations.

KEY TASKS

- Speak with maintenance crews to understand standard repairs.
- Assimilate data (i.e., soil properties, slopes adjacent to roadways, rainfall, vegetation coverage, and corridors) into a geodatabase.
- Explore all possible repair methods.
- Create database of all slope failures mapped.
- Examine areas of repeat failures.
- Develop a geotechnical model to assess highway slope stability



PROJECT DELIVERY



CUSTOMER FOCUS



FOSTER STEWARDSHIP



PRESERVE ASSETS



OPTIMIZE PERFORMANCE



PROMOTE SAFETY



VALUE EMPLOYEES

TxDOT Innovations and Technology Deployment Briefs

Slope Repair and Maintenance Management System (SRMMS)

DATA SOURCES

The data sources utilized were from readily available United States Geological Survey (USGS) soil maps (soil properties and class), United States Department of Agriculture and National Resources Conservation Service soil data sets (soil properties), Texas Natural Resources Information System LiDAR elevation data sets (slope), USGS National Landcover Database (vegetation), TxDOT (corridors and failure locations), and National Oceanic and Atmospheric Administration Atlas 14 (precipitation).

PROACTIVE APPROACH

A multi-criteria decision support system was developed to recommend a list of methods for maintenance and repair of critical slope segments.



Process of accessing the list of slope repair methods and recommended implementation practices for avoiding recurring failures using the map-based interface.



Shallow slope failure at the intersection of SE Loop 286 and Clarksville Street, Paris, Texas.



SRMSS interface showing different widgets.



Map-based interface displaying slope susceptibility levels for embankments along the TxDOT Paris District highway corridors.



POINT OF CONTACT

Noel Paramanatham, P.E.
District Engineer
TxDOT, Paris District
903-737-9206

[Contact](#)

