

MarTREC UTC Project Information Form
 USDOT Tier 1 University Transportation Center
 Agency ID or Contract Number 69A3551747130

Project Title: Rapid Assessment of Internal Erosion Damage and Erodibility in Levees
Project Abstract (Brief Description): Recent flooding events in Oklahoma, Missouri, Illinois, and Arkansas have tested our nation's levee systems and highlighted the vulnerability of our transportation system to disruptions and delays caused by natural disasters. Levee failures not only disrupt navigable waterways, they can also impact rail and truck transportation. The majority of levee failures occur because of instabilities caused from internal and overtopping erosion. Sand boils are the most common signs of distress for levees experiencing underseepage or internal erosion. These surficial defects indicate that a path has developed through or below the levee in which water is able to freely move. In some cases, sand boils are low-risk and are left without repair, but in other cases sand boils can indicate that a much larger problem exists below the surface. Sand boils are often remediated using relief wells, seepage berms, or cutoff walls; however, determining the extent of the damage within the levee is difficult and estimating future performance of the levee without this information can be dangerous. Traditional drilling and sampling techniques only provide discrete data points which can lead to ineffective repairs and wasted funds. Alternatively, seismic and electrical geophysical techniques can be used to assess large sections of levees in a timely manner to locate weak and saturated zones which often indicate locations where internal erosion damage may be present. The ability of geophysical methods to enable quick measurements of material properties over large areas was demonstrated in a previous project, MarTREC 5006, however, there is currently no widely accepted correlation between geophysical properties and many vital engineering properties such as erodibility. This means the data gathered from geophysical methods may be used to compare different sections of the same levee qualitatively, but they cannot be used to make a quantitative assessment of the levee for engineering purposes. This hampers efforts to identify which levee segments are in the greatest need for repair.
Describe Implementation of Research Outcomes (or why not implemented) - Place any photos here <i>To be determined upon conclusion of the project:</i> Method for rapid levee evaluation
Impacts/Benefits of Implementation (actual, not anticipated) <i>To be determined upon conclusion of the project:</i>
Web Links: martrec.uark.edu
Budget (Funding) Amounts & Source(s) (US DOT +Match(s) =Total Costs): MarTREC funds \$149,849 + Matching fun \$75,107 = Total funds \$224,956
Project Start and End Dates: July 1, 2020 – December 31, 2023 complete
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Principal Investigator Institution (University): University of Arkansas