Research Office
Long Range Planning Division
505 Deaderick Street, Suite 900
Nashville, TN 37243
TDOT.Research@tn.gov

Research Project Title: Geosynthetic Reinforced Soils for Bridge Approach Slab Support

Purpose of the Project

Bridge approach slabs serve as transition structural elements from the flexible highway pavement to a bridge. They should offer a smooth comfortable transition for vehicles and motorists. However, motorists experience uncomfortable "bumps at the ends of the bridge" which causes an increase in maintenance costs, riders discomfort, damage to vehicles, and potentially public safety. This project addresses TDOT urgent need to develop a cost-effective and practical design of bridge approach slabs.

Scope and Significance

We propose a comprehensive design approach that increases the rigidity of the approach slab coupled with soil/backfill material reinforcement to increase soil/backfill material bearing capacity in a target support area to spread the load and minimize the settlement. The following tasks are proposed:

- Review TDOT requirements for acceptable backfill materials and guidelines for bridge abutments and approach embankments.
- Perform a comprehensive 3D Finite Element (FE) analysis to better understand the interaction between the approach slab and the supporting backfill material.
- Develop detailed engineering drawings for the design of approach slab, backfill material, joints, drainage, erosion control, and soil reinforcement for different types of embankments used in bridge construction in Tennessee.
- Implement the design for new construction or retrofitting of a bridge and evaluate its performance after opening the bridge for traffic.

Expected Outcomes

The new design will be ready for implementation in new construction and repair of damaged approach slabs immediately. It is expected to improve the performance of approach slabs which will result in reduced maintenance cost, improved ride comfort, reduced damage to vehicles, and improved public safety.

Time Period

The time period for the project is 18 months.

Contact Information

Principal Investigator (PI):	**TDOT Lead Staff:**
Dr. Khalid Alshibli Department of Civil & Env. Engineering University of Tennessee 422 John D. Tickle Building Knoxville, TN 37996 Phone: 865-974-7728 Email: Alshibli@utk.edu	Mr. Ted A Kniazewycz, Director Structures Division Phone: 615-741-3351 Email: ted.kniazewycz@tn.gov