Major Project Report

on

"Influence of Moving Vehicles on Time-Dependent Response of ESC Improved Embankment"

Degree of Bachelor of Technology

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Certificate

This is to certify that the major project report entitled **"Influence of moving vehicles on time-dependent response of ESC Improved Embankment"** is a bonafide work carried out by **"Sawan Kumar, Laya S. Reddy and Sakshi Jha"**, who carried the project work under my supervision. This work has not been submitted in part(s) or full for any Degree or Diploma to this University or elsewhere to the best of my knowledge.

10/5/2024

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Abstract

The influence of moving vehicles on the time dependent response of an enhanced stone column improved embankment is a crucial aspect of infrastructure design and maintenance. This study investigates the dynamic interaction between vehicular traffic and embankment structures reinforced with stone columns, aiming to understand their time-dependent behavior under various loading conditions.

Enhanced stone column techniques, such as stone column inclusion and soil improvement methods, are commonly employed to reinforce embankments and enhance their stability and load-bearing capacity. However, the dynamic loading from moving vehicles can significantly impact the performance of these reinforced embankments over time.

The study focuses on understanding the load transfer mechanisms, dynamic soil-structure interaction phenomena, and fatigue behavior induced by repetitive loading from passing vehicles. Special attention is given to the effectiveness of stone column reinforcement in mitigating stress concentrations and enhancing load-bearing capacity over time. Performance assessment metrics are developed to quantify settlement, deformation, stress distribution, and resilience, facilitating a thorough evaluation of the embankment's long- term performance under realistic traffic conditions.

Additionally, risk analysis techniques are employed to identify potential failure modes and vulnerabilities, leading to the proposal of appropriate mitigation strategies. The numerical models used in the study are rigorously validated and calibrated using field data, ensuring the accuracy and reliability of the simulation results. By addressing these aspects, the study aims to provide valuable insights into the design, maintenance, and management of embankments subjected to dynamic loading from moving vehicles, ultimately contributing to the development of more resilient and sustainable infrastructure systems.