



CIVIL, MATERIALS, AND ENVIRONMENTAL ENGINEERING

COLLEGE OF ENGINEERING

Seminar

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1047 ERF

11am

Reliability Based Design Optimization of Geosynthetic Anchor Trenches in MSW Landfills

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Abstract

Municipal solid waste landfills are lined at the bottom with low permeable clay and geomembrane liners. If the design process overlooks the unpredictable characteristics of the soil-liner interface friction angle, it may lead to inaccurate assessments of slope stability. Utilizing deterministic techniques that disregard the random nature of these design parameters can result in either an overestimation or underestimation of the likelihood of system failure. Furthermore, the factor of safety method can result in either overly cautious or inadequate designs. To address these issues, a framework for reliability-based design optimization (RBDO) of anchor trenches has been proposed. This framework incorporates the variability of variables such as unit weight, and the soil-liner interface friction angle to optimize the design process. The methodology presented in the research provides an optimized design approach for various types of anchor trenches within the reliability framework. The RBDO is utilized to calculate the anchorage capacity and GMB tensile force. This study gives particular attention to the design of

V-shaped anchors. The proposed logical framework considers the variability of design parameters.

Bio

Dr. Raviteja is an assistant professor in the Department of Civil Engineering at SRM University AP, India. He is presently working in the Geotechnical and Geoenvironmental Engineering Laboratory at University of Illinois Chicago on SERB International Research Experience Fellowship funded by Department of Science & Technology, Govt. of India. Dr. Raviteja received PhD from Indian Institute of Technology Hyderabad. His research interests include appending probability and reliability-based design improvements, assessment uncertainty and material heterogeneity, studying spatial and temporal variabilities of various soil and MSW properties, application AI-ML techniques to solve various challenges in Geotechnical & Geoenvironmental Engineering systems. Dr. Raviteja received several grants and awards like: SERB-SIRE Fellowship Rs.19.30 Lakhs, selected for High Level Foreign Research Fellowship from Tsinghua University (China), JASSO Scholarship of ¥2,30000/- to work at Ritsumeikan University (Japan), Research Excellence Award (IIT Hyderabad). He is a member of several technical bodies like ICE, ASCE and IGS. He published a total of 30 journal articles, book chapters and conference papers. He is currently serves as Editorial Committee Member for Journal of Communications in Sciences & Mathematics (UNIFAP, Brazil), reviewer of various journals including Journal of Hazardous, Toxic and Radioactive Waste, Journal of Materials in Civil Engineering, ASCE.

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