IGS CHENNAI CHAPTER
LECTURE ON 20 MARCH 2008 AT IIT MADRAS AT 4:30PM

Design and performance prediction of reinforced embankments on soft soils: Inferences from Sackville and Leneghans reinforced embankments

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Abstract

Two documented case histories involving geosynthetic reinforced embankments on soft soils are discussed. A polyester woven geotextile was used as reinforcement at Sackville and its short term performance was investigated. Predictability of the behaviour of Sackville embankment under working stress conditions was investigated using the FEM with three different models, namely Modified Cam Clay (MCC), a rate based elasto viscoplastic and a creep based elasto viscoplastic model, to represent the foundation soft soil. This study suggests that all three models are capable of predicting the performance of this embankment reasonably well despite their inability to give accurate predictions of all the behaviour characteristics for the entire construction. A geogrid reinforced embankment was constructed on a PVD stabilised soft soil adjoining an existing road at Leneghans, NSW, Australia and its performance was monitored over a long period. This embankment was back analysed with MCC and creep model and the creep model was found to predict the multiple characteristics better than the MCC model. The combination of field data and numerical analysis are used to provide insights regarding factors to be considered in future design and for predicting the performance.

Brief bio data - Dr. Rajah Gnanendran

Dr. Rajah Gnanendran is Senior Lecturer in Civil Engineering at the University of New South Wales (UNSW) at its ADFA campus in Canberra, Australia. He obtained a BSc (Civil Engineering) from University of Peradeniya, Sri Lanka, MEng from Carleton University, Canada and PhD from the University of Western Ontario, Canada and Diploma in University Teaching, University of New Brunswick, Canada.

His research interests are in reinforced soil systems (geosynthetics, fibre, etc.), embankments on soft soils, pavement material characterization, numerical modeling using the finite element and finite difference methods and soft soil engineering.

He has published over 40 refereed articles in prestigious journals and international conferences and one of his papers published in the Canadian Geotechnical Journal was awarded the 1996 R.M. Quigley Award Honourable Mention Certificate.