

ABOUT THE SHORT COURSE

A geosynthetic reinforced piled embankment consists of a pile foundation and an embankment that is reinforced at its base with a geosynthetic reinforcement. A piled embankment can be built quickly, the influence on adjacent sensitive objects is limited and residual settlements are prevented. In the course, the load distribution and load-deformation mechanisms of a basal reinforced piled embankment will be fully explained. You will have the possibility to practice design with a calculation program and numerical calculations will be introduced. Case histories will bring insight into the practical aspects of design and construction. In addition, special subjects related to the application of piled embankments will bring participants up-to-date with experiences in Europe and south-east Asia. These subjects include construction materials, pile systems and the use of Cost-Benefit Analysis for choosing between piled embankments and other construction methods and present day societal challenges such as climate change adaptation and upgrading of railway embankments to higher speeds and larger loads.

WHO SHOULD ATTEND

This course is intended for Project managers, advisers, designers, constructors that are involved in the design of basal reinforced piled embankments. Policy makers in transport infrastructure for municipals and regional or national principles. Contractors of transport infrastructure.

BIODATA OF SPEAKERS



Dr. Suzanne J.M. van Eekelen is a researcher in geotechnical engineering and an expert in the field of geosynthetic reinforcement, in particular piled embankments. She has reviewed or advised many piled embankment projects and she specialises in laboratory experiments and field monitoring. She is chairing the Dutch SBRCURnet committees 'Design Guideline Basal Reinforced Piled Embankments' and 'Retaining Walls of Reinforced Soil' and works for Deltares, a knowledge institute for applied research in the field of water and subsurface. Suzanne van Eekelen has developed an analytical model for the design of the basal reinforcement in piled embankments. This model was adopted in the Design Guideline for Basal Reinforced Piled Embankments. Suzanne is the author or co-author of more than 10 international journal papers and approximately 100 proceedings papers and other publications. Dr. Suzanne van Eekelen received the IGS Award of the International Geosynthetics Society for her research on basal reinforced piled embankments in 2014, the Award for the best paper in Geotextiles and Geomembranes in 2012, two Honourable Mentions for her papers in Geotextiles and Geomembranes in 2011 and 2015 and the Dutch/Belgium Keverling Buisman-Science award 2011.

Ir. Arjan Venmans is expert consultant at Deltares for Road and Railroad construction on soft soils. Arjan received his Degree in Engineering Geology from the Delft Technical University in the Netherlands. Ir. Arjan Venmans also has been chairman of many national working groups for development of guidelines for construction on soft soil, and secretary of The Netherlands Society of Soil Mechanics and Geotechnical Engineering. He is a registered evaluator for the European Commission Research Programs. He published over 45 scientific publications, many reports and presented many lectures. As academic visitor he is teaching at the Geo-Engineering Section of Delft Technical University.



Ir. Chris Lawson is the Technical Director for Ten Cate Geosynthetics Group. Chris received his Engineering Degrees from The University of New South Wales, Sydney, Australia. He has worked in the field of geosynthetics for 35 years in Australia, Europe, North America and Asia. During this period, he has served on a number of international organizations developing Standards and Codes of Practice, including BS8006 a British Standard Code of Practice for Soil Reinforcement. Chris has acted as technical advisor on many large scale geosynthetics projects in the field of embankments, reinforced soil techniques and coastal, hydraulic and environmental engineering in Australia, Asia and Europe. He is the author of over 50 technical papers on geosynthetics, geotechnical engineering and hydraulic and marine engineering. He has been the keynote speaker at numerous conferences and symposia. He is an ex-Council Member of the International Geosynthetics Society. In 2006, Chris was invited to present the Third Giroud Lecture at the 8th International Conference on Geosynthetics in Yokohama, Japan.

Ir. EG Balakrishnan is a Director of GCU Consultants Sdn Bhd, a specialist geotechnical consultancy firm. He graduated from University Malaya with honours degree in Civil Engineering in 1985. He has worked in both consulting and construction firms covering the general disciplines of civil engineering before pursuing a Master Programme in Geotechnical Engineering at Asian Institute of Technology, Bangkok from 1992 to 1994. He started GCU Consultants Sdn Bhd in 1998. Since then, he has been involved in large civil engineering projects providing geotechnical consultancy services. His scope



covered all ranges of geotechnical engineering comprising foundation, ground treatments, slopes, walls & retention systems for highways, railways, deep excavation, reclamation, high rise buildings, ports, oil & gas and large civil infrastructure projects. Some of the major completed projects include Express Rail Link, Guthrie Expressway, Electrified Double Track Projects, New Pantai Expressway, Besraya Expressway, Pengerang Oil Terminal, MRT 1&2, and West Coast Expressway. He has published number of papers locally and internationally. He also made number of presentations locally and internationally on various topics. He is also a committee member of the Geotechnical Engineering Technical Division of Institution of Engineers, Malaysia (IEM).

TENTATIVE PROGRAMME

TIME	DAY 1	DAY 2
08:30am – 09:00am	Registration	
09:00am – 09:30am	Welcome Remarks and Introduction By Ir. Balakrishnan & Dr. Suzanne van Eekelen	Geosynthetic materials and quality control By Ir. Chris Lawson
09:30am – 10:30am	Geosynthetic reinforced pile supported embankments: Research and new developments; basic principles, load distribution By Dr. Suzanne van Eekelen	Numerical modelling By Dr. Suzanne van Eekelen
10:30am – 11:00am	Tea Break	
11:00am – 12:30pm	Requirements and initial details of reinforced piled embankments By Dr. Suzanne van Eekelen Use of waste materials in piled embankments and other road and railway constructions By Ir. Arjan Venmans	Pile Systems: Pile systems By Ir. Balakrishnan & Dr. Suzanne van Eekelen Ir. EG Balakrishnan/Dr. Suzanne Van Eekelen Cost Benefit Analysis (CBA) of construction on soft soil, comparing piled embankments with other construction types By Ir. Arjan Venmans
12:30pm – 13:30pm	Lunch	
13:30pm – 14:15pm	Design of Reinforced Piled Embankment By Dr. Suzanne van Eekelen	Adaptation of Transport Infrastructure to Climate Change with emphasis on rain and flooding By Ir. Arjan Venmans
14:15pm – 15:00pm	Cases; realization; details; tips and tricks By Chris Lawson	Upgrading of a railway construction to higher speed and load By Ir. Arjan Venmans Local Practice on Piled Embankments, By Ir. Balakrishnan
15:00pm – 15:30pm	Tea Break	
15:30pm – 16.45pm	Playing with piled embankments and get a feeling: practice design calculations and optimization By Ir. Chris Lawson & Dr. Suzanne van Eekelen	Hydraulic applications, By Ir. Chris Lawson
16.45pm – 17:30pm	Discussion, evaluation & closure	Discussion & closure
	End of Day 1	End of Course