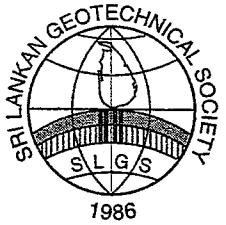
FROM THEORY TO THE PRACTICE OF UNSATURATED SOIL MECHANICS

Conducted by
Prof. D.G. Fredlund
Dr. Lal Samrasekera
University of Saskatchewan, Canada

May 22 and 23, 2000
At Trans Asia Hotel

Organised by the
SRI LANKAN GEOTECHNICAL SOCIETY



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Prof. D.G. Fredlund

B.Sc. (University of Saskatchewan) 1962
M.Sc. (University of Alberta, Edmonton) 1964
Ph.D. (University of Alberta, Edmonton) 1973

Dr. Delwyn G. Fredlund received his B.Sc. Degree from the University of Saskatchewan (1962) and his M.Sc. (1964) and Ph.D. (1973) degrees from the University of Alberta. He began his academic carrer as a lecturer in the University of Saskatchewan in 1966, serving as Head of the Department of Civil Engineering from 1989 to 1995.

Dr. Fredlund's research has focused on the behaviour of unsaturated soils and modeling of the stability of slopes. His research work has spanned over 30 years and has resulted in the formation of the unsaturated soil group at the University of Saskatchewan. His research on the behaviour of unsaturated soils has covered all of the classical areas of soil mechanics such as seepage, shear strength and volume change. These theories have lead to the development of saturated / unsaturated seepage theories and their usage in solving shear strength and volume change problems. His research on saturated / unsaturated numerical modeling has concentrated on extending conventional finite element modeling to span the entire profile of soils encountered, from the ground surface downward.

He has supervised 15 Ph. D. students and 55 M.Sc. students and has published extensively. More than 200 papers were published in referred journals, conference proceedings and in the form of various reports. He is the co-author of the book Soil Mechanics for Unsaturated Soils published in 1993.

The application of unsaturated soil mechanics has resulted in both national and international consulting activities. Dr. Fredlund has been involved in consulting projects for US Corps of Engineers, the governments of Hong Kong and Malaysia, IDRC projects in China and Kenya and a CIDA project in Vietnam.

Dr. Fredlund is the Chairman of the TC 6 Committee of the ISSMGE on unsaturated soils. He is also the co-founder of the geotechnical software company Geo-Slope International Ltd. Calgary, Canada.

Dr. Fredlund has received numerous awards, the most recent being the 1999 – Scotiabank – AUCC awarded for excellence in Internationalization. In 1995, he was the prestigious Cross Canada lecturer of the Canadian Geotechnical Society. He has been the keynote speaker for many international forums, has served as a member of many geotechnical boards and committees, and is a fellow of the Engineering Institute of Canada.

Dr. Lal Smarasekera

B.Sc. (Sri Lanka)
M.Asc. (University of British Colombia)
Ph.D. (University of Alberta)

Dr. Lal Samarasekera obtained his B.Sc. from the University of Sri Lanka, Peradeniya Campus, in 1977. He worked as an Assistant Lecturer in the Department of Engineering Mathematics before proceeding to obtain a master's degree in 1982, at the University of British Columbia, Canada. After working briefly as a Research Engineer at the University of British Columbia, Lal proceeded to do his doctoral thesis at the University of Alberta, Canada. He obtained his Ph.D. in 1989 and worked as a Post-doctoral fellow at the University of Alberta. Dr. Samarasekera also worked as the instructor in charge of the first year engineering degree program at the Red Deer College, Alberta, before joining the College of Engineering at the University of Saskatchewan as a Research Officer in 1991.

Dr. Samarasekera's research interests are in numerical methods in geotechnical engineering as well as unsaturated soils. Some of his previous research areas included the study of hyperbolic models and the modeling of uncoupled stress and consolidation behaviour. He has also worked on finding solutions to stand-up time of tunnels constructed in soft ground. Lal has an interest in the fundamental behaviour of soils in general. Dr. Samarasekera also has some background in soil dynamics which he studied at the University of British Columbia. Dr. Samarasekera teaches both graduate and undergraduate courses in geotechnical engineering at the University of Saskatchewan.

Since joining the University of Saskatchewan, and subsequently, the Unsaturated Soils Group, Dr. Samarasekera has been involved in a variety of research projects in unsaturated soils lead by Professor Del Fredlund. Lal has worked closely with Dr. Del Fredlund for nearly 10 years, and also with other members of the Unsaturated Soils Group. His most recent involvement is in the numerical simulation of matric suction equalization of thermal conductivity sensors installed in the laboratory as well as in the field.

Lal is a member of the American Society of Civil Engineers, Canadian Society for Civil Engineering, Canadian Geotechnical Society, Tunnelling Association of Canada, the Geo Institute of the American Society of Civil Engineers, and the International Society for Soil Mechanics and Geotechnical Engineering.

Message from the President of the Sri Lankan Geotechnical Society

Although Sri Lanka with its tropical climate has a greater part of its land mass underlain by unsaturated soils, the science of Soil Mechanics as taught to the undergraduates in our universities remains the conventional science which was developed by Terzaghi and others for soils in temperate climates. This has led to situations where the application of Soil Mechanics principles by our engineers has sometimes led to very conservative designs, and at other times to unsafe designs.

Concepts such as 'wetting fronts', 'apparent cohesion due to soil suction', 'shear strength parameters of unsaturated soils', etc., are introduced only in a very limited way even to our postgraduate students.

Therefore, in order to provide a state of the art knowledge of the Engineering Behaviour of Unsaturated soils, the Sri Lankan Geotechnical Society has been very fortunate to obtain the services of Prof. Del Fredlund and Dr. Lal Samarasekera, both from the University of Saskatchewan, Canada.

Prof. Fredlund is internationally recognized as a foremost authority in the field of unsaturcted soils. He has built up a team at the University of Saskatchewan, Canada which has contributed significantly to the understanding of unsaturated soils.

I am confident that with their lectures supported by the comprehensive set of notes that they have prepared, our members will be in a position to develop a better understanding of the engineering problems related to our residual soils.

Prof. B.L. Tennekoon
President, Sri Lankan Geotechnical Society

SHORT COURSE SCHEDULE

MONDAY, MAY 22, 2000		TUESDAY, MAY 23, 2000	
(1).	**9.15 - 10.00 - Session – 1** Scope and need for unsaturated soil mechanics	(9).	**9.15 - 10.00 - Session – 9** Estimation of unsaturated soil property functions using "Soil Vision" as a knowledge – base system
(2).	**10.00 - 10.45 - Session - 2** Nature and role of the soil-water characteristic curve	(10).	**10.00 - 10.45 - Session - 10** Use of "Soil Cover" for the design of cover systems
	10.45 - 11.00 - Break		**10.45 - 11.00 - Break**
(3).	**11.00 - 11.45 - Session - 3** Shear Strength characterization	(11).	**11.00 - 11.45 - Session - 11** Seepage modelling involving unsaturated soils
(4).	**11.45 - 12.45 - Session - 4** Theory and measurement of soil suction	(12).	**11.45 - 12.45 - Session - 12** Slope stability analyses involving unsaturated soils
	12.45 - 1.45 - Lunch		**12.45 - 1.45 - Lunch**
(5).	**1.45 - 2.30 - Session - 5** Steady state and transient seepage for soil property characterization	(13).	**1.45 - 2.30 - Session – 13** Volume change predictions in swelling soils (Parts 1 & 2)
(6).	**2.30 - 3.15 - Session - 6** Quantification of moisture flux boundary conditions	(14).	**2.30 - 3.15 - Session - 14** Thermal conductivity sensors to soil suction
	3.15 - 3.30 - Break		**3.15 - 3.30 - Break**
(7).	**3.30 - 4.15 - Session - 8** Field Performance Monitoring for Unsaturated Soils	(15).	**3.30 - 4.15 - Session -15** General discussion
(8).	**4.15 - 5.00 - Discussion**		

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