For favour of posting

Jointly Organized by
The Hong Kong University of Science and Technology
Department of Civil Engineering
American Society of Civil Engineers (ASCE)
Hong Kong Section

SEMINAR

Modelling Cover Systems for (Mine) Waste

By Prof. Delwyn G. Fredlund

Abstract
One of the most active unsaturated soil mechanics applications over the past two decades has been the design of cover systems associated with mine wastes; particularly "store and release" (or evaporative) covers. Cover systems appear to be a success story for unsaturated soil mechanics; however, it is time to stop and ask the question, "Are we doing it right?" The design of cover systems involves many complexities along with the numerical solution of a highly nonlinear partial differential equation for moisture flow. Nonlinear soil properties must be evaluated for the unsaturated hydraulic conductivity and water storage of all soils involved in the cover as well as the waste material. Some or all of these soils will likely go towards low degrees of saturation at some times during the year. The degrees of saturation may fall below the residual degree of saturation leading to extremely nonlinear soil properties. The nonlinearities result in a challenge with regard to modeling the behavior of the cover system. Most computer software codes were never developed to handle such extreme nonlinearities and as a result they have serious problems of non-convergence. The climatic conditions involve random thermal and moisture flux variations. A design pattern for rainfall, evaporation and evapo-transpiration needs to be quantified. The evaporative flux is particularly challenging to compute and as well, the computation of the amount of runoff requires a characterization of the rainfall events. There is need for the establishment of "checks and balances" in the design procedures for cover systems. Unsaturated soil properties need to be established in the most reliable manner possible and the computer software needs to be capable of solving highly nonlinear partial differential equations. Field evaluations of the performance of many cover systems are indicating that there are deficiencies in the present design procedures and these need to be further addressed.

Date	:	10 January 2007, Wednesday
Time	:	4:00 p.m. to 5:00 p.m.
Venue	:	Room 3574 (Lift 27/28) Civil Engineering Department Conference Room The Hong Kong University of Science and Technology (For enquires please call 2358 7164 Ms Rebecca Yau)

Biography
Dr. Delwyn G. Fredlund received his Ph.D. degree in 1973, after studying at the University of Alberta, Canada. He taught at the University of Saskatchewan, in the area of geotechnical engineering from 1966 to the year 2000 when he retired. During his tenure at the University of Saskatchewan, he established the Unsaturated Soil Group that became internationally recognized for its research into a variety of geotechnical problems related to unsaturated soil mechanics. He served as Head of the Department of Civil Engineering from 1989 to 1994. He has published over 200 research papers and is the co-author of the book, “Soil Mechanics for Unsaturated Soils”. He is also a co-founder of the company, Geo-Slope International Ltd., a geotechnical software company. He has served on many committees and was chairman of the TC6 committee on Unsaturated Soils of the ISSMGE for 12 years. He has received numerous awards for his research including member of the Canadian Academy of Engineering, and the prestigious Legget Award from the Canadian Geotechnical Society and Terzaghi Lecturer of the American Society of Civil Engineers.

* * * ALL ARE WELCOME * * *