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Geotechnical Engineering
Technical Division



WEBINAR TALK ON FAILURE INVESTIGATION OF A GEOSYNTHETIC REINFORCED SOIL SLOPE SUBJECT TO RAINFALL



SPEAKER :

PROF. YANG KUO-HSIN

(NATIONAL TAIWAN UNIVERSITY)

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15 SEPTEMBER 2021, WEDNESDAY

2.00PM - 4.00PM

Registration Fees
(effective 1st August 2020)
IEM Members : RM 15.00
IEM Non Members : RM 70.00
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SYNOPSIS

This webinar talk presents a comprehensive failure investigation of a geosynthetic reinforced soil (GRS) slope subjected to rainfall. The investigated slope is a 26-m-high, four-tier, geogrid-reinforced structure backfilled with low plasticity silty clay which contains more than 60% of fines. The GRS slope first exhibited excessive deformation after typhoons and heavy rainfall from 2010 to 2012. The slope collapsed in 2013 due to two sequential typhoon events with a total accumulated rainfall of more than 600 mm. The slope failed in a compound failure mode in which the failure surface partially cut through the reinforced zone and partially passed along the interface between the weathered sandstone and intact shale. By using the recorded rainfall, site geology, and measured soil and reinforcement parameters, a series of coupled hydro-mechanical finite element analyses were performed on the basis of the unsaturated soil mechanics to examine the failure mechanism and factors triggering the slope failure. The numerical results indicated that the slope failure occurred due to the development of positive porewater pressure within the reinforced zone and retained weather sandstone layer. Observations and lessons learned from this case history are discussed, and remedial measures to improve the overall slope stability are proposed and evaluated.

SPEAKER'S PROFILE

Prof Yang Kuo-Hsin is currently a Professor and Associate Chair of the Department of Civil Engineering at the National Taiwan University (NTU). He completed his Ph.D. degree at the University of Texas in Austin in 2009 under the supervision of Dr. Zornberg for research entitled "Stress Distribution within Geosynthetic-Reinforced Soil Structures." He worked with Dr. Bathurst as a visiting scholar in the Department of Civil Engineering at the Royal Military College (RMC), Canada in 2015. Dr. Yang has many years' experience in research and practice in geotechnical and geosynthetics engineering and contributed considerably to this field in education and service.

Dr. Yang also participates in the IGS technical committee for soil reinforcement (TC-R), and the ISSMGE technical committee for slope stability in engineering practice (TC208), and reinforced fill structures (TC218). He serves as the council committee member in the Taiwan Geotechnical Society and Taiwan Geosynthetics Society. He also serves as the editor-in-chief of the Taiwan Geotechnical Society Special Publication and the Journal of GeoEngineering. He is in the core organizing committee for the 16th Asian Regional Conference on Soil Mechanics and Geotechnical Engineering (16ARC 2019), and the 7th Asian Regional Conference on Geosynthetics (GeoAsia 2022). Dr. Yang was selected as the Taiwanese delegate for the 7th Asia Young Geotechnical Engineers Conference (2012) in Tokushima, Japan, and for the 8th Southeast Asian Geotechnical Conference-Young People Session (2013) in Singapore. Dr. Yang was also invited to deliver lectures at university seminars and annual society meetings and to teach short courses in workshops organized by the Professional Civil Engineers Association, governmental agencies, and consulting engineering company.