THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

土木及環境工程學系
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

SEMINAR

SPH AND MPM MODELLING OF LANDSLIDE-STRUCTURE INTERACTION

Speaker

Prof. Sabatino CUOMO

Professor of Geotechnical Engineering at the University of Salerno, Italy

Abstract

The concern of scientists and populations towards landslides has been increasing in the last years because the effects of climate change are evident. Shorter and heavier rainfall event are expected, and frequency will increase as well. Thus, slope stability and potential damage to structures are topical issues. Fortunately, numerical modelling has experienced unprecedented developments in terms of novel formulations (e.g. meshless methods) and computational capability (GPU, parallelization, etc). This is the fundamental reason why Landslide-Structure-Interaction (LSI) is attracting attention. However, new challenges still exist if landslides of the flow-type are considered. This is mostly related to the large deformation scenarios usually associated to the post-failure stage. Once the mechanisms of landslide initiation and propagation have been postulated or already understood, then different alternatives for modelling can be used. Full-3D approaches are still time consuming unless very sophisticated algorithms and powerful computational tools are available. On the other hand, depth-integrated SPH (Smooth Particle Hydrodynamics) modelling is a good compromise to account for irregular slope topography over large areas while renouncing to accurate along-the-vertical variations of soil velocity. In other cases, cross-section 2D MPM (Material Point Method) modelling reproduces the soil-structure interaction in quite general conditions also including different types of soils and materials composing the endangered structures. In the paper, some examples are shown, which depict the state-of-the-art and future perspectives of this topical issue.

Biography

Sabatino Cuomo is Professor of Geotechnical Engineering at the University of Salerno, Italy. His research interests include Landslide Mechanisms, Solid-fluid transition, Landslide Dynamics, Regional slope stability, Slope erosion, Geosynthetics reinforcement, Laboratory testing of unsaturated soils, Constitutive Modelling. He has published more than 120 papers in international journals and conference proceedings. Prof. Sabatino Cuomo serves as Associate Editor-in-Chief of Geoenvironmental Disaster Journal, Springer, and member of the Editorial Board of Computers and Geotechnics, Canadian Geotechnical Journal, Soils and Foundations, Geotechnical Enginenering, and Environmental Geotechnics. He is Coordinator of LARAM School (International School on "LAndslide Risk Assessment and Mitigation) for PhD students, and Board Officer for the Italian Chapter of IGS (International Geosynthetics Society).

22 August 2023
Tuesday

Morning

Civil Engineering Conference Room
Room 3574 (Lift 27/28)
HKUST

Enquiry:

Ms. Rebecca Yau
cerebeca@ust.hk