



Spring 2022 CCLT Abstract

Characterizing rock slope failure mechanisms using combined remote sensing and numerical modelling.

Slope failure mechanisms vary in complexity from simple translational slides to complex multi-block/multi-slip mechanisms. Developments in remote sensing and slope analysis techniques have seen a rapid transition from air photograph interpretation and simple limit equilibrium analyses to increasingly sophisticated and readily available ground and airborne/satellite sensing methods and 2D/3D numerical models. A focus of this talk will be on improving our understanding of complex rock slope failure mechanism through remote sensing characterization and monitoring constrained against numerical models. Using case studies of natural and engineered slopes from North America, Europe and Africa the importance of structural geology, kinematics and slope damage will be demonstrated. With the continued advent of innovative technology the need to fully optimize available data is emphasized, along with the need to ensure that the limitations of these techniques are considered and that the key role of conventional engineering geological and engineering geomorphological investigations recognized.

Doug Stead, Emeritus Professor

Biography

Doug Stead began his career in geotechnical engineering in 1978 working on rock and soil slope stability at Nchanga Open Pit in the Zambian Copperbelt, Africa. This was immediately followed by periods working in engineering geology and rock mechanics consulting in the UK and Hong Kong. In 1984, after obtaining his PhD at the University of Nottingham, UK, investigating rock slope stability in UK surface coal mining, he was appointed Lecturer in Applied Geology at the University of Papua New Guinea and then in 1986 Assistant Professor in Geological Engineering at the University of Saskatchewan, Canada. From 1996-2000 he was Chair in Geotechnical Engineering at Camborne School of Mines, University of Exeter, UK. In 2000, he returned to Canada where he was Chair in Resource Geotechnics at Simon Fraser University, B.C. until June 30th 2021. His research has focussed on experimental rock mechanics (brittle fracture and acoustic emission), open pit and underground geomechanics and rock slope engineering. In particular he has



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emphasised the applications of numerical modelling, remote sensing, and more recently mixed-virtual reality visualisation in rock engineering.

Doug has received several awards from the Canadian Geotechnical Society, CGS, for his contributions to geotechnical engineering, including the societies most prestigious award the RH Legget Medal (2017), the John Franklin Award for contributions to Canadian rock mechanics (2009) and the Thomas Roy Award for engineering geology, (2008). He was also awarded the Engineering Institute of Canada, John B. Stirling Medal (2019) for his leadership and services in geotechnical engineering.

Dr. Stead has authored over 300 technical papers on engineering geology and rock engineering. He has delivered numerous keynotes and invited lectures, including the 34th Online ISRM Lecture in June 2021 and the 1st CGS Online lecture in Spring 2022. He was co-author with Dr. Loren Lorig of the chapter on numerical modelling in the textbook “Rock Slope Engineering, 2017 5th edition” by Dr Duncan Wyllie and was co-editor, with Dr. John Clague, of the book “Landslides: Types, mechanisms and modelling”

Dr. Stead served as both ISRM Vice-President for North America and Chair of the ISRM Technical Commissions Oversight Committee (2015-19), He is Past Vice-President Technical for the Canadian Geotechnical Society and Past President of the Canadian Geoscience Council. . Dr. Stead is currently a Fellow of the International Society of Rock Mechanics, a Fellow of the Engineering Institute of Canada, a Professional Engineer (PEGBC), an Honorary Visiting Professor at the University of Exeter, UK and an Honorary Professor at the University of British Columbia, Canada. Dr. Stead has undertaken extensive research/consultancy on a wide range of rock engineering projects in Europe, North America, Africa, Asia, and Australia.